Special Resource Management INC.

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A Montana Power/Entech Company • AA/EOE M/F

MEMORANDUM

Date: November 30, 1992

To: John Anderson - Nampa-Meridian Irrigation District
Dave Durrett - Walla Walla Shopping Center Associates
Ronlena ~~Sally Goodell~~ - DEQ Community Programs
Gary Himes - White Leasure Company
Craig Shepard - DEQ Southwest Idaho Regional Office
Robert Wilkosz - DEQ Permits and Enforcement

From: Bradley Harr and Dana Brennan, Special Resource Management, Inc.

Subject: Westpark groundwater remediation report for the air stripper's second year of operation.

The purpose of this memorandum is to provide an update of the air stripper's second year of operation and status of the Westpark groundwater remediation program. Information concerning the volume of water treated, treatment system efficiency, monitoring results, PCE air emissions, and quality assurance is presented. This report includes a second year operation overview of data collected from March 1991 through February 1992. Quarterly monitoring results were previously submitted on September 16, 1991 (first quarter status report and second quarter results); December 10, 1991 (second quarter status report and third quarter results); and March 25, 1992 (fourth quarter results).

SECOND YEAR OPERATION OVERVIEW (March 1991 to February 1992)

VOLUME OF GROUNDWATER TREATED

The volume of contaminated groundwater treated during the second year of operation was 128,154,900 gallons. This is equivalent to 60.6% of the total volume treated from system start-up through February 26, 1992 (end of the second operation year). Of the total volume treated from system start-up, 66,163,890 gallons (31.2%) were treated from well WP-1; 93,575,310 gallons (44.2%) were treated from well WP-2; and 51,808,500 gallons (24.6%) were treated from well WP-3.

Based on an annual average flow rate of 263 gpm (when in operation) for the second year, the volume of water treated each quarter is expected to be approximately 34,085,000

gallons. The estimated volume of water treated each quarter (based on SRM's routine documentation of the volume gauge readings) is summarized in the following table:

QUARTER	DATE	VOLUME TREATED (gallons)
FIRST	March 1991 - May 1991	34,491,000
SECOND	June 1991 - August 1991	*24,908,600
THIRD	September 1991 - November 1991	35,684,200
FOURTH	December 1991 - February 1992	33,071,100

* Repairs and/or adjustments made to the system account for lower volumes of water treated.

Table A-1 in Appendix A summarizes the estimated volume of groundwater treated from each well since February 8, 1991. Table A-2 (2nd Operating Year Overview and Monthly Summary) summarizes approximate volume of water treated each month (first of the month to end of the month); repairs and adjustments; and report dates addressing operation, repairs, and adjustments.

GROUNDWATER MONITORING AND GAUGING

Quarterly Groundwater Monitoring

Quarterly groundwater monitoring was performed as outlined in the Westpark Consent Order. Second year, quarterly sampling was conducted May 15 and 16, 1991 (first quarter); August 7 and 8, 1991 (second quarter); November 14 and 15, 1991 (third quarter); and February 26, 1992 (fourth quarter). Groundwater samples were collected from monitoring wells 9, 11, 16, 18, 19, 20R, 21; and pumping wells WP1, WP2, and WP3 during each sampling event, with the exception of February 1992. SRM received verbal authorization from Ms. Sally Goodell of DEQ, on February 26, 1992 to limit quarterly sampling of wells 11, 19, and 20R to an annual sampling event in August; therefore, only monitoring wells 9, 16, 18, 21 and the pumping wells were sampled on February 26, 1992. Samples were also taken from the combined influent (WP123I) and the combined effluent (WP123E) during every sampling event. Duplicate samples and equipment blanks were included for Quality Assurance/Quality Control (QA/QC) purposes. All of the samples were analyzed for PCE and TCE utilizing protocol established in EPA method 601-602.

Data validation reports and chain of custody records for the each quarter of the second operating year are included in Appendix B. Quarterly sampling results are summarized in Appendix C, Table-1 and a representation of the PCE levels and seasonal trends is presented in Figure C-1. The results of groundwater elevation gauging conducted during each sampling event are presented in Table C-2. Four maps (C-1 May 1991, C-1 August 1991, C-1 November 1991, and C-1 February 1992) exhibit the well locations with their associated PCE concentrations for each quarter. Groundwater elevation contours for each quarter are presented in Maps C-2 May 1991, C-2 August 1991, C-2 November 1991, and C-2 February 1992.

DEQ and SRM Split Sampling Event

A split sampling event was conducted between DEQ and SRM on November 14, 1992. SRM has not obtained DEQ's analysis results or a summary report; however, verbal results for DEQ's samples were obtained from Mr. Craig Shepard on January 31, 1992. The results are as follows:

WELL #	DEQ	SRM	RPD
WP1	511	654	24.5%
WP2	509	620	19.6%
WP3	366	409	11.0%
WP123I	340	474	32.9%
WP123E	3.49	3.3	2.8%

The relative percent difference (RPD) was calculated for each split sample. All RPDs are within the accepted standard of 25%, except the results for WP123I (RPD = 32.9%). The high RPD is likely due to the variability of groundwater pumping rates of each pumping well and the influent water passing through the influent booster pump. Obtaining "true" splits of the stripper influent water is not possible since the groundwater is being pumped through the system at 250 to 300 gallons per minute. The combination of groundwater pumped from WP1, WP2, and WP3 to the influent is not a homogeneous mixture. Varying PCE levels are possible, due to the fluctuation of pumping rates and volumes in each pumping well at any given time. Since SRM has not received the QA/QC report for DEQ's analysis results, a conclusive determination can not be made at this time.

PCE AIR EMISSIONS AND AIR PERMIT REPORTING REQUIREMENTS

The Permit to Construct an Air Pollution Emitting Source requires SRM to report monitoring results to the Idaho Air Quality Bureau. The monitoring reports are to include:

(a) flow rates from each of the remediation wells and the air stripper discharge
(b) PERC content from each of the remediation wells and the discharge, expressed in both pph and ppm
(c) PERC emissions to the atmosphere expressed in both pph and ppm
(d) a cumulative graph of the air stripper operation which depicts PERC emissions to the atmosphere vs. time

Flow Rates

The cumulated volume of groundwater from each of the remediation wells and the total combined volume for the second year of operation are presented in Table A-1, Appendix A and are discussed in the section "Volume of Groundwater Treated". The data presented in Appendix A is estimated from flow meter readings taken during routine inspections of the air stripper.

Week of operation flow rates (as required in Section 5.3a of the permit) for each of the pumping wells are summarized in Appendix D and F. Figure F-1 in Appendix F illustrates the effluent flow rates over time. The air stripper operated at an yearly average flow rate of 263 gpm for the second year. Significant changes in flow rates during the second year were not noted.

PCE Concentrations in Pumping Wells

Tables D-1, D-2, and D-3 summarize pumping rates and PCE values for each of the pumping wells. Fluctuations of concentrations in each of the wells appear to have followed a seasonal pattern, with higher concentrations during the fall and spring quarters; however, a clear trend has not been definitively established.

PCE Emissions to the Atmosphere

PCE emissions to the atmosphere are calculated and reported in Appendix E. The permit limits PCE emissions to less than 0.25 pounds per hour (pph). This requirement has been met for all sampling events since system startup (see Table E-1). Average PCE emissions for the second year of operation were typically .06 pph. This equates to approximately 525 pounds of PCE.

AIR STRIPPER MAINTENANCE AND EFFICIENCY

The air stripper encountered problems with freezing and electrical shut downs during the winter of 1990. To avoid similar problems, SRM "winterized" the air stripper on November 23, 1991, which involved minor modifications to the system. Solenoid valves were installed in the piping loops to allow the release of any water that may be trapped between the well pumps and the air stripper. An insulated enclosure was constructed around the well riser piping and insulated tape was placed around several exposed, vulnerable areas. No interruptions in system operation were noted once the air stripper modifications were made. Other than the winterization of the air stripper, only minor adjustments were made during the second year of operation.

Flow rates have averaged 263 gpm for the second year of operation and effluent concentrations, as indicated by quarterly sampling, have been well below the 10 ppb limit established for the treatment system in the Consent Order. The following table summarizes the PCE concentrations for combined influent and effluent during each quarterly sample event, and the yielded PCE removal rates.

DATE	INFLUENT (ppb)	EFFLUENT (ppb)	REMOVAL RATE
05/16/91	430	3.4	99.2 %
08/08/91	640	4.7	99.3 %
11/14/91	474	3.3	99.3 %
02/26/92	410	2.5	99.4 %
2ND YEAR AVERAGE	**488.5**	**3.5**	**99.3 %**

APPENDIX A

TABLE A-1
ESTIMATED VOLUME OF TREATED GROUNDWATER
(Volumes given in thousands of gallons)

DATE	WEEK #	WP-1 PERIOD	WP-1 CUM.	WP-2 PERIOD	WP-2 CUM.	WP-3 PERIOD	WP-3 CUM.	PERIOD TOTAL	CUM. TOTAL
2-08-91	49	803.70	22,219.80	1,122.20	50,358.70	779.80	10,815.30	2,706.00	83,394.00
2-15-91	50	283.27	22,503.07	1,187.04	51,545.74	890.28	11,705.58	2,360.60	85,754.60
2-22-91	51	726.12	23,229.19	1,141.05	52,686.79	726.12	12,431.70	2,593.30	88,347.90
3-07-91	52	859.20	24,088.39	966.60	53,653.39	859.20	13,290.90	2,685.00	91,032.90
3-15-91	53	974.35	25,062.74	1,079.28	54,732.67	944.37	14,235.27	2,998.00	94,030.90
3-21-91	54	799.80	25,862.54	859.93	55,592.60	745.67	14,980.94	2,405.40	96,436.30
3-28-91	55	901.70	26,764.24	948.45	56,541.05	821.55	15,802.49	2,671.70	99,108.00
4-05-91	56	1,046.76	27,811.00	1,126.06	57,667.11	998.18	16,800.67	3,172.00	102,280.00
4-11-91	57	486.46	28,297.46	531.36	58,198.47	478.98	17,279.65	1,496.80	103,776.80
4-18-91	58	1,103.22	29,400.68	1,186.80	59,385.27	1,053.08	18,332.73	3,343.10	107,119.90
4-25-91	59	890.18	30,290.86	944.12	60,329.39	863.20	19,195.93	2,697.50	109,817.40
5-02-91	60	781.18	31,072.04	792.67	61,122.06	723.74	19,919.67	2,297.60	112,115.00
5-09-91	61	1,024.91	32,096.95	1,087.03	62,209.09	993.86	20,913.53	3,105.80	115,220.80
5-15-91	62	905.83	33,002.78	905.83	63,114.92	852.54	21,766.07	2,664.20	117,885.00
5-21-91	63	649.28	33,652.06	688.63	63,803.55	629.60	22,395.67	1,967.50	119,852.50
5-30-91	64	1,172.66	34,824.72	1,207.15	65,010.70	1,069.19	23,464.86	3,449.00	123,301.50
6-12-91	66	996.86	35,821.58	1,152.62	66,163.32	965.71	24,430.57	3,115.20	126,416.70
6-19-91	67	923.58	36,745.16	977.90	67,141.22	814.92	25,245.49	2,716.40	129,133.10
6-26-91	68	888.89	37,634.05	969.70	68,110.92	835.02	26,080.51	2,693.60	131,826.70
7-11-91	70	1,146.75	38,780.80	1,325.93	69,436.85	1,110.92	27,191.43	3,583.60	135,410.30
7-18-91	71	374.91	39,155.71	409.00	69,845.85	352.19	27,543.62	1,136.10	136,546.40
7-26-91	72	1,016.93	40,172.64	1,119.65	70,965.50	945.02	28,488.64	3,081.60	139,628.00
8-02-91	73	403.92	40,576.56	427.68	71,393.18	356.40	28,845.04	1,188.00	140,816.00
8-07-91	74	665.79	41,242.35	718.53	72,111.71	593.28	29,438.32	1,977.60	142,793.60

TABLE A-1
ESTIMATED VOLUME OF TREATED GROUNDWATER
(Volumes given in thousands of gallons)

DATE	WEEK #	WP-1 PERIOD	WP-1 CUM.	WP-2 PERIOD	WP-2 CUM.	WP-3 PERIOD	WP-3 CUM.	PERIOD TOTAL	CUM. TOTAL
8-16-91	75	1,009.77	42,252.12	1,069.16	73,180.87	890.97	30,329.29	2,969.90	145,763.50
8-21-91	76	639.85	42,891.97	677.48	73,858.35	564.57	30,893.86	1,881.90	147,645.40
8-29-91	77	1,043.19	43,935.16	1,105.47	74,963.82	965.34	31,859.20	3,114.00	150,759.40
9-06-91	78	994.74	44,929.90	1,053.25	76,017.07	877.71	32,736.91	2,925.70	153,685.10
9-13-91	79	881.49	45,811.39	947.27	76,964.34	802.55	33,539.46	2,631.30	156,316.40
9-17-91	80	500.58	46,311.97	515.31	77,479.65	456.41	33,995.87	1,472.30	157,788.70
9-26-91	81	1,152.23	47,464.20	1,185.63	78,665.28	1,001.94	34,997.81	3,339.80	161,128.50
10-05-91	82	1,007.96	48,472.16	1,037.61	79,702.89	919.03	35,916.84	2,964.60	164,093.10
10-10-91	83	752.58	49,224.74	763.49	80,466.38	665.33	36,582.17	2,181.40	166,274.50
10-18-91	94	1,011.19	50,235.93	1,011.19	81,477.57	866.73	37,448.90	2,889.10	169,163.60
10-25-91	85	887.67	51,123.60	887.67	82,365.24	760.86	38,209.76	2,536.20	171,699.80
10-31-91	86	727.06	51,850.66	748.44	83,113.68	662.90	38,872.66	2,138.40	173,838.20
11-07-91	87	864.26	52,714.92	876.78	83,990.46	764.06	39,636.72	2,505.10	176,343.30
11-14-91	88	757.75	53,472.67	725.73	84,716.19	651.02	40,287.74	2,134.50	178,477.80
11-22-91	89	1,126.69	54,599.36	1,094.49	85,810.68	997.92	41,285.66	3,219.10	181,696.90
12-04-91	91	1,195.81	55,795.17	1,195.81	87,006.49	1,024.98	42,310.64	3,416.60	185,113.50
12-19-91	93	2,038.44	57,833.61	1,818.07	88,824.56	1,652.79	43,963.43	5,509.30	190,622.80
12-30-91	95	1,351.64	59,185.25	777.19	89,601.75	1,250.27	45,213.70	3,379.10	194,001.90
01-09-92	96	1,332.20	60,517.45	732.71	90,334.46	1,265.59	46,479.29	3,330.50	197,332.40
01-17-92	97	607.32	61,124.77	349.21	90,683.67	561.77	47,041.06	1,518.30	198,850.70
01-24-92	98	883.62	62,008.39	543.77	91,227.44	838.31	47,879.37	2,265.70	201,116.40
01-29-92	99	682.34	62,690.73	402.41	91,629.85	664.85	48,544.22	1,749.60	202,866.00
02-05-92	100	918.40	63,609.13	505.12	92,134.97	872.48	49,416.70	2,296.00	205,162.00
02-14-92	101	1,145.92	64,755.05	630.26	92,765.23	1,088.62	50,505.32	2,864.80	208,026.80
02-26-92	103	1,408.84	66,163.89	810.08	93,575.31	1,303.18	51,808.50	3,522.10	211,548.90

TABLE A-2

2ND OPERATING YEAR OVERVIEW AND MONTHLY SUMMARY

MONTH OF OPERATION	APPROX. VOLUME TREATE PER MONTH (gallons)	REPAIRS - ADJUSTMENTS - COMMENTS	REPORT DATES ADDRESSING OPERATIONS & ADJUSTMENTS
1st QUARTER			
MARCH 1991	10,760,100	Effluent resample for the February 1991 Quarterly sample event	March 27, 1991
APRIL 1991	12,687,900	Tightening of bolts to reduce fan vibrations	September 16, 1991
MAY 1991	11,505,600	First quarter sample event for the second year of operation.	September 16, 1991
2nd QUARTER			
JUNE 1991	8,525,200	Unknown system shut down - No damage to the stripper found - possibly due to an electrical switch turn off. IDHW Air Quality Bureau inspection of air stripper construction.	December 10, 1991 December 10, 1991
JULY 1991	8,989,300	Fan balanced on July 17, 1991. System down twice - possibly due to below capacity discharge flow rate.	December 10, 1991

TABLE A-2 (continued)
2ND OPERATING YEAR OVERVIEW AND MONTHLY SUMMARY

MONTH OF OPERATION	APPROX. VOLUME TREATE PER MONTH (gallons)	REPAIRS - ADJUSTMENTS - COMMENTS	REPORT DATES ADDRESSING OPERATIONS & ADJUSTMENTS
AUGUST 1991	9,943,400	Sump level adjustment. Second quarter sample event for the second year of operation.	December 10, 1991
3rd QUARTER			
SEPTEMBER 1991	10,369,100	N/A	
OCTOBER 1991	12,709,700	N/A	
NOVEMBER 1991	7,858,700	Third quarter sample event for the second year of operation. Split sample event with Division of Environmental Quality. SRM sent one split sample from well 21 to Evergreen Analytical (Wheat Ridge, CO) to compare results w/ Analytical Labs (Boise, ID)	October 29, 1992
		Stripper down from Nov. 25 through Nov. 29 for winterization.	November 15, 1991

TABLE A-2 (continued)
2ND OPERATING YEAR OVERVIEW AND MONTHLY SUMMARY

MONTH OF OPERATION	APPROX. VOLUME TREATE PER MONTH (gallons)	REPAIRS - ADJUSTMENTS - COMMENTS	REPORT DATES ADDRESSING OPERATIONS & ADJUSTMENTS
4TH QUARTER			
DECEMBER 1991	12,305,000	N/A	
JANUARY 1992	8,864,100	N/A	
FEBRUARY 1992	9,386,900	Stripper shut down on Feb. 19 and Feb. 25 for storm drain clean out.	October 29, 1992
		Fourth quarter sample event for the secon year of operation.	October 29, 1992
		Requested authorization to reduce the quarterly sampling of wells 19, 20R, and 1 to an annual sampling conducted in August.	February 26, 1992 - Memo to Sally Goodell, DEQ

APPENDIX B

DATA VALIDATION AND QUALITY ASSURANCE - May 1991

A data validation report is provided in order to evaluate the data obtained against a pre-established set of criteria to assure that the data are adequate for their intended use. The reliability of monitoring and measurement data is assessed and quality improvements efforts can be conducted accordingly. The following subsections address the data validation criteria and results for the Westpark Groundwater Remediation Project - March 1991 through May 1991. This validation encompasses results for 12 water samples, one field equipment blank, and one duplicate sample. The following issues are discussed:

- Data Completeness
- Holding Time
- Surrogate Spike Recoveries
- Matrix Spike Results (batch only)
- Blank Analysis Results
- Assessment of Laboratory Precision
- Sample Detection Limits

The results of the evaluation are presented below.

· Data Completeness

Fourteen samples were submitted to Analytical Laboratories of Idaho. Air stripper, monitoring well and field quality control samples (duplicate and equipment blank) were analyzed for PCE and TCE. Valid data completeness was 100% for this event. This exceeds the 95% completeness requirement as set by Methods 601-602. Review of lab data sheets and chain of custody forms indicate that all sample bottles were received in good condition.

· Holding Time

Contractual holding time between sample extraction and analysis is 14 days for PCE. This criteria was met for all samples.

· Surrogate Spike Results

Surrogate spike results were reviewed and evaluated. The percent recovery for these spikes must be within the 80%-120% control limits. All results were within this range. The surrogates used were fluorobenzene and 1-chloro-2-bromopropane.

· Matrix Spike Results

One matrix spike result for the entire batch of samples was reported by the lab. The matrix spike percent recovery fell between 91.2 and 109 percent. This is acceptable according

to the Method 601-602 control limit of 80-120%.

· Blank Analysis Results

One equipment blank was used in this sampling event. The results were negative. This indicates that no contamination of samples occurred during sampling or transport.

·Assessment of Laboratory Precision

One duplicate samples was submitted for the air stripper influent. The calculated relative percent differences between the original and the duplicate was 0.0%. This data provides a measure for field procedure and lab analysis variability. These results are very reasonable and show good laboratory precision.

· Sample Detection Limits

The detection limit for PCE, as set by Method 601-602, is 0.5 ug/L. This is the target limit established for and obtained by the laboratory. The Westpark groundwater is free of compounds that interfere with Method 601-602 and there is little problem maintaining a detection limit of 0.5 ug/L.

· Conclusion

Evaluation of the quarterly monitoring data indicates that all data is in accordance with the requirements established for this project. None of the data shall be rejected. Any data that is of some question, based on the QA/QC project criteria, will be flagged and an explanation of the concern will be provided.

CHAIN OF CUSTODY RECORD

DATE 5/16/91 PAGE 1 OF 3

Special Resource Management, Inc.
200 N. 4th St., Suite 206
Boise, ID 83702
208-345-3667 (24 Hr.)
800-654-2504 (In Idaho)

LABORATORY ANALYTICAL LABORATORIES
ADDRESS 1804 North 33rd street
Boise Idaho 83702
ATTENTION:
PROJECT NAME WEST PARK
JOB/P.O. NO. 14-90-01
SAMPLE MANAGER (SIGNATURE)

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	TESTING PARAMETERS: PCE	TESTING PARAMETERS: TCE	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
MW-19	5/15/91	11:55			1	x		
MW-19	"	"						
MW-11	"	13:45						
MW-11	"	"						
MW-20	"	14:52						
MW-20	"	14:52						
MW-16	"	15:15						
MW-16	"	15:15						
MW-21	"	15:57						
MW-21	"	15:57						
MW-18	"	16:45						
MW-18	5/15/91	16:45			↓	↓		

RELINQUISHED BY: John Surach	RECEIVED BY: Brenda Wright	DATE: 5/16/91	TOTAL NUMBER OF CONTAINERS:
COMPANY: SRM	COMPANY: ALI	TIME: 16:55	REMARKS:
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	

SHIPMENT METHOD: DELIVERED

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

CHAIN OF CUSTODY RECORD

DATE 5/17/91 PAGE 3 OF 3

Special Resource Management, Inc.
200 N. 4th St., Suite 206
Boise, ID 83702
208-345-3667 (24 Hr.)
800-654-2504 (In Idaho)

LABORATORY ANALYTICAL LAB
ADDRESS 1124 North 7th street
Coeur d'Alene Idaho 83814
ATTENTION:
PROJECT NAME INEEL TRIP
JOB/P.O. NO. 14-90-01
SAMPLE MANAGER (SIGNATURE)

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	TESTING PARAMETERS: TCE	TESTING PARAMETERS: TCE	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
IC-SLM-EF	5/16	14:55			1	1		

RELINQUISHED BY	RECEIVED BY	DATE	TIME
Kim Sivertsen	Brenda Wright	5/16/91	16:55
COMPANY: SRM	COMPANY: ALI		
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	

TOTAL NUMBER OF CONTAINERS:

REMARKS:
Total # of Samples = 26
PLUS 2 EA TRAVEL BLANKS

SHIPMENT METHOD: DELIVERED

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

DATA VALIDATION AND QUALITY ASSURANCE - August 1991

A data validation report is provided in order to evaluate the data obtained against a pre-established set of criteria to assure that the data are adequate for their intended use. The reliability of monitoring and measurement data is assessed and quality improvements efforts can be conducted accordingly. The following subsections address the data validation criteria and results for the Westpark Groundwater Remediation Project - June 1991 through August 1991. This validation encompasses results for 13 water samples, one duplicate water sample, one field equipment blank, and one travel blank. The section regarding Assessment of Laboratory Precision provides a discussion of the high relative percent difference between the duplicate samples collected during this sample event. The following issues are discussed:

- Data Completeness
- Holding Time
- Surrogate Spike Recoveries
- Matrix Spike Results (batch only)
- Blank Analysis Results
- Assessment of Laboratory Precision
- Sample Detection Limits

The results of the evaluation are presented below.

· Data Completeness

Sixteen samples were submitted to Analytical Laboratories of Idaho. Air stripper, monitoring well and field quality control samples (duplicate, equipment blank, and travel blank) were analyzed for PCE and TCE. Valid data completeness was 100% for this event. This exceeds the 95% completeness requirement as set by this project. Review of laboratory data sheets and chain of custody forms indicate that all sample bottles were received in good condition.

· Holding Time

Contractual holding time between sample collection and analysis is 14 days for PCE. This criteria was met for all samples.

· Surrogate Spike Results

Surrogate spike results were reviewed and evaluated. The percent recovery for these spikes must be within the 80%-120% control limits. All results were within this range. The surrogates used were fluorobenzene and 1-chloro-2-bromopropane.

· Matrix Spike Results

One matrix spike result for the entire batch of samples was reported by the lab. The matrix spike percent recovery fell between 86.7 and 116 percent. This is acceptable according to the Method 601-602 control limit of 80-120%.

· Blank Analysis Results

One equipment blank and one travel blank were used in this sampling event. The results were negative. This indicates that no contamination of samples occurred from the sampling equipment or during transport to the laboratory.

·Assessment of Laboratory Precision

Duplicate samples are submitted to the laboratory to provide a measure for field procedure and laboratory analysis variability. One duplicate sample was submitted for monitoring well #21. The calculated relative percent difference between the original and the duplicate was 34%. These results are above the target QA/QC criteria (+/- 20 %) for relative percent difference between duplicate samples. Investigations revealed the dilution factors of the duplicates were not the same. The Laboratory Supervisor, Dave Bennett, was contacted and informed of the 34% relative percent difference. SRM requested the laboratory to review their QA/QC for the Westpark samples and determine if the data was valid. SRM received a response from Mr. Bennett on October 28, 1991 (Appendix H)and a follow up phone call was made to the laboratory in November 1991 to further discuss QA/QC. It was determined that the following factors contributed to the 34% difference:

1) The duplicate samples include some natural variance since they are field duplicates, not laboratory duplicates.
2) The samples were diluted by the laboratory to quantify the analytes within the PCE standard calibration curve. The sample for well #21 was diluted at 1 : 100 and the duplicate, #21d, was diluted at 1 : 10. It should be noted that some amount of error can be expected from sample dilution.
3) The 1 : 100 dilution of sample #21 placed the test results at the lower end of the standard curve. The standard curve ranged from 0 to 20 ppb (5 points) and the lower end of the standard curve showed a higher bias for the data based upon EPA known QC standards.
4) The higher bias multiplied by the larger dilution factor yielded a significant difference between the two samples.

Based on SRM's review and discussions with the laboratories, the 34% relative percent difference is higher than desired, however the rationale for the difference is valid and reasonable. The results for EPA QC-knowns analyzed with the batch of samples were within the acceptable range used by the laboratory (80% - 120%).

CORRECTIVE ACTION: SRM has requested the laboratory to recalibrate a new standard curve if EPA QC knowns are outside a range of 90% - 110%. In addition, SRM has requested that the dilution factors used should yield data as close to the center point of the standard curve as possible and that no dilution values be utilized if they are below the reporting

detection limit.

· Sample Detection Limits

The detection limit for PCE, as set by Method 601-602, is 0.5 ug/L. This is the target limit established for and obtained by the laboratory. The Westpark groundwater is free of compounds that interfere with Method 601-602 and there is little problem maintaining a detection limit of 0.5 ug/L.

· Conclusion

Evaluation of the quarterly monitoring data indicates that all data is in accordance with the requirements established for this project, except the laboratory precision. The factors contributing to the non-conformance are discussed above. Given the discussion above and the fact that a 34% relative difference for field and laboratory precision combined is not extreme, none of the data shall be rejected. Corrective actions have been taken to limit future problems and to improve the data base. The August samples will be flagged as "outside the target precision criteria", but none of the data shall be rejected as invalid. Any data that is of some question, based on the QA/QC project criteria, will be flagged and an explanation of the concern will be provided.

CHAIN OF CUSTODY RECORD

DATE AUG. 8, 1991 PAGE 2 OF 2

Special Resource Management, Inc.
917 Island
Boise, ID 83706
208-345-3667 (24 Hr.)
800-654-2504 (In Idaho)

LABORATORY ANALYTICAL LABORATORIES
ADDRESS 1804 North 33rd St
Boise Id 83703
ATTENTION:
PROJECT NAME WEST PARK
JOB/P.O. NO.
SAMPLE MANAGER (SIGNATURE) John Swartz

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	PCE	TCE										NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
WP-1 (3BA)	8/8/91		PLC	WEST PARK	X	X		15434									
WP-2 (3BA)	"		"	" "	X	X		435									
WP-3 (3BA)	"		"	" "	X	X		436									CAP ON ONE BOTTLE CRACKED

RELINQUISHED BY	RECEIVED BY	DATE	TIME
John Swartz	Brenda Wright	8-8	11:50
COMPANY: SRM	COMPANY: ALI		
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	

TOTAL NUMBER OF CONTAINERS:

SHIPMENT METHOD:

REMARKS:

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

CHAIN OF CUSTODY RECORD

DATE AUG. 8, 1991 PAGE 1 OF 2

Special Resource Management, Inc.
917 Island
Boise, ID 83706
208-345-3667 (24 Hr.)
800-654-2504 (In Idaho)

LABORATORY: ANALYTICAL LABORATORIES
ADDRESS: 1804 North 33rd ST
Boise Idaho 83703
ATTENTION:
PROJECT NAME: WEST PARK
JOB/P.O. NO.
SAMPLE MANAGER (SIGNATURE): John Sumsion

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	PCE	TCE										NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
18 (3EA)	8/7/91		PVC	WEST PARK	X	X											421
11 (3EA)	"			" "	X	X											422
20R (3EA)	"			" "	X	X											423
21 (3EA)	"			" "	X	X											424
D1 (3EA)	"			" "	X	X											425
16 (3EA)	"			" "	X	X											426
14 (3EA)	"			" "	X	X											427
EB (3EA)	"			" "	X	X											428
TB (4EA)	"			" "	X	X											429
19 (3EA)	"			" "	X	X											430
9 (3EA)	"			" "	X	X											431
123E (3EA)	"			" "	X	X											432
123I (3EA)	"			" "	X	X											433

RELINQUISHED BY	RECEIVED BY	DATE	TOTAL NUMBER OF CONTAINERS:	SHIPMENT METHOD:
John Sumsion	Brenda Wright	8-8	REMARKS:	SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:
COMPANY: SRM	COMPANY: ALI	TIME: 11:50		
RELINQUISHED BY	RECEIVED BY	DATE		
COMPANY	COMPANY	TIME		
RELINQUISHED BY	RECEIVED BY	DATE		
COMPANY	COMPANY	TIME		

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

CHAIN OF CUSTODY RECORD

DATE 5/16/91 PAGE 2 OF 3

Special Resource Management, Inc.
200 N. 4th St., Suite 206
Boise, ID 83702
208-345-3667 (24 Hr.)
800-654-2504 (in Idaho)

LABORATORY ANALYTICAL LABORATORIES
ADDRESS 1804 North 33rd street
Boise Idaho 83703
ATTENTION:
PROJECT NAME WEST FORK
JOB/P.O. NO. 14-90.01
SAMPLE MANAGER (SIGNATURE)

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	TESTING PARAMETERS: PCE	TCE	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
WP-1	5/16	12:15		WEST FORK	X	X		
WP-1	5/16	12:15		"				
MW-9	5/16	13:45		"				
MW-9	5/16	13:45		"				
WP-3	"	14:00						
WP-3	"	14:00						
15-SRM-WT-123	"	14:16		AIR STRIPPER INFLUENT				
16-SRM-WT-123	"	14:16		"	↓	↓		
16-SRM-WT-123E	"	14:16		AIR STRIPPER EFFLUENT	X			
16-SRM-WT-123E	"	"		"	X			
16-SRM-WT-12	"	"				X		
16-SRM-WT-12	"	"						
16-SRM-EB	"	14:55		EAST FORK	↓	↓		

RELINQUISHED BY	RECEIVED BY	DATE	TOTAL NUMBER OF CONTAINERS:	SHIPMENT METHOD: DELIVERED
Jon Cunliff	Brenda Wright	5/16/91	REMARKS:	SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:
COMPANY SRM	COMPANY ALI	TIME 16:55		
RELINQUISHED BY	RECEIVED BY	DATE		
COMPANY	COMPANY	TIME		
RELINQUISHED BY	RECEIVED BY	DATE		
COMPANY	COMPANY	TIME		

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

DATA VALIDATION AND QUALITY ASSURANCE - NOVEMBER 1991

A data validation report is provided in order to evaluate the data obtained against a pre-established set of criteria to assure that the data are adequate for their intended use. The reliability of monitoring and measurement data is assessed and quality improvements efforts can be conducted accordingly. The following subsections address the data validation criteria and results for samples collected on November 14, 1991. This validation encompasses results for 13 water samples, one duplicate water sample, one field equipment blank, and one travel blank. The section regarding Assessment of Laboratory Precision provides a discussion of the high relative percent difference between the duplicate samples collected during this sample event. The following issues are discussed:

- Data Completeness
- Holding Time
- Surrogate Spike Recoveries
- Matrix Spike Results (batch only)
- Blank Analysis Results
- Assessment of Laboratory Precision
- Interlaboratory Split Samples
- Sample Detection Limits

The results of the evaluation are presented below.

· Data Completeness

Sixteen samples were submitted to Analytical Laboratories of Idaho. Air stripper, monitoring well and field quality control samples (duplicate, equipment blank, and travel blank) were analyzed for PCE and TCE. Valid data completeness was 100% for this event. This exceeds the 95% completeness requirement as set by this project. Review of laboratory data sheets and chain of custody forms indicate that all sample bottles were received in good condition.

· Holding Time

Contractual holding time between sample collection and analysis is 14 days for PCE. This criteria was met for all samples.

· Surrogate Spike Results

Surrogate spike results were reviewed and evaluated. The percent recovery for these spikes must be within the 80%-120% control limits. All results were within this range. The surrogates used were fluorobenzene and 1-chloro-2-bromopropane. The recoveries ranged from 93.4% to 110% for fluorobenzene and 85.3% to 113% for 1-chloro-2-bromopropane.

· **Matrix Spike Results**

One matrix spike result for the entire batch of samples was reported by the lab. The matrix spike percent recovery fell between 98.7% and 101%. This is acceptable according to the Method 601-602 control limit of 80-120%.

· **Blank Analysis Results**

One equipment blank and one travel blank were used in this sampling event. The results were negative (<0.5). This indicates that no contamination of samples occurred from the sampling equipment or during transport to the laboratory.

· **Assessment of Laboratory Precision**

Duplicate samples are submitted to the laboratory to provide a measure for field procedure and laboratory analysis variability. One duplicate sample was submitted for monitoring well 18. The calculated relative percent difference (RPD) between the original and the duplicate was 0.0%. This data is very reasonable and show good laboratory precision.

· **Interlaboratory Split Samples**

Analytical Laboratories of Idaho has conducted all sample analysis for SRM throughout the operation of the Westpark air stripper. DEQ utilized the Idaho Department of Health and Welfare, Bureau of Laboratories, to perform sample analysis for the test-split sampling event between DEQ and SRM conducted November 14, 1991. Split samples were taken from WP1, WP2, WP3, WP123I, and WP123E. The calculated relative percent differences for PCE are as follows:

WELL #	DEQ	SRM	RPD
WP1	511	654	24.5%
WP2	509	620	19.6%
WP3	366	409	11.0%
WP123I	340	474	32.9%
WP123E	3.49	3.3	2.8%

The accepted relative percent difference between two laboratories is 30%. All of the above data are within this standard with the exception of the WP123I results. The likely contributing factor is due to a non-homogeneous mixture of groundwater pumped from WP1, WP2, and WP3 (see "Groundwater Monitoring and Gauging" section). Due to the likely variability of influent samples, the high RPD for WP123I is reasonable; however, a conlusive determination can not be made since SRM has not received a QA/QC report for DEQ's analysis results.

SRM also sent a test-split sample from MW 21 to Evergreen Laboratories, Wheat Ridge,

Colorado, to compare analysis results with Analytical Laboratories. The calculated relative percent difference between the two samples is 4.4%, which falls well within the accepted relative percent difference of 30% for interlaboratory splits.

- **Sample Detection Limits**

The detection limit for PCE, as set by Method 601-602, is 0.5 ug/L. This is the target limit established for and obtained by the laboratory. The Westpark groundwater is free of compounds that interfere with Method 601-602 and there is little problem maintaining a detection limit of 0.5 ug/L.

- **Conclusion**

Evaluation of the quarterly monitoring data indicates that all data is in accordance with the requirements established for this project, except the laboratory precision for the WP123I split sample. An explanation is provided in the "Groundwater Monitoring and Gauging" section. The high relative percent difference of 32.9% is not extreme and will not be rejected at this time. A complete evaluation will be made once DEQ's analysis results are received. None of the remaining data for this project shall be rejected. Any data that is of some question, based on the QA/QC project criteria, will be flagged and an explanation of the concern will be provided.

CHAIN OF CUSTODY RECORD

DATE November 15, 1991 PAGE 1 OF 2

Special Resource Management, Inc.
917 Island
Boise, ID 83706
208-345-3667 (24 Hr.)
800-654-2504 (In Idaho)

LABORATORY: Analytical Laboratories, Inc.
ADDRESS: 1804 N. 33rd Street
Boise, Idaho 83703
ATTENTION: Dave Bennett
PROJECT NAME: Westpark
JOB/P.O. NO.: 12.1490.01
SAMPLE MANAGER (SIGNATURE): Shelley Berry

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	TESTING PARAMETERS: PCE	TCE	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
14-WP1	11/14/91	940	BRoinske	Westpark	√	√	3	22342
14-WP2	11/14/91	1010	BRoinske	Westpark	√	√	3	343
14-WP3	11/14/91	1120	BRoinske	Westpark	√	√	3	344
14-WP123I	11/14/91	1045	BRoinske	Westpark	√	√	3	345
14-WP123E	11/14/91	1055	BRoinske	Westpark	√	√	3	346
14-19	11/14/91	1112	BRoinske	Westpark	√	√	3	347
14-14	11/14/91	1329	BRoinske	Westpark	√	√	3	348
14-20R	11/14/91	1400	BRoinske	Westpark	√	√	3	349
14-11	11/14/91	1445	BRoinske	Westpark	√	√	3	350
14-16	11/15/91	920	BRoinske	Westpark	√	√	3	351
14-21	11/15/91	955	BRoinske	Westpark	√	√	3	352
14-18	11/15/91	1030	BRoinske	Westpark	√	√	3	353
14-9	11/15/91	1105	BRoinske	Westpark	√	√	3	354

RELINQUISHED BY: Shelley Berry	RECEIVED BY: Jessica K Hill	DATE: 11/15/91	TOTAL NUMBER OF CONTAINERS:
COMPANY: SRM	COMPANY: ALI	TIME: 3:15pm	REMARKS: Stored on ice
RELINQUISHED BY	RECEIVED BY	DATE	SHIPMENT METHOD: Hand delivered
COMPANY	COMPANY	TIME	SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

CHAIN OF CUSTODY RECORD

DATE November 15, 1991 PAGE 2 OF 2

Special Resource Management, Inc.
917 Island
Boise, ID 83706
208-345-3667 (24 Hr)
800-654-2504 (In Idaho)

Brad Harris 2/11/93

LABORATORY: Analytical Laboratories, Inc.
ADDRESS: 1804 N. 33rd Street
Boise, Idaho 83703
ATTENTION: Dave Bennett
PROJECT NAME: Westpark
JOB/P.O. NO.: 12.1490.01
SAMPLE MANAGER (SIGNATURE): Shelley Berry

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	TESTING PARAMETERS	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
14-OTT			Bgrinsell	Westpark	✓ ✓	2	~~2343~~ 2255
14-D			Bgrinsell	Westpark	✓ ✓	3	~~344~~ 356
Travel Blank						3	~~345~~
							~~345~~
							~~347~~
							~~345~~
							~~361~~
							~~2~~
							~~3~~
							~~3~~
							~~3~~
							~~3~~
							~~354~~
							~~3~~

RELINQUISHED BY	RECEIVED BY	DATE	TIME
Shelley Berry	Tricia McKellar	11/15/91	3:15 PM
COMPANY: SRM	COMPANY: ALI		
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY	TIME	

TOTAL NUMBER OF CONTAINERS: 16

SHIPMENT METHOD: Hand delivered

REMARKS: Stored on ice

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033
(303) 425-6021

Date Due 12/5/91

Holding Time 11/22/91

E.A. Cooler # N/A

Rush _____

SAMPLE LOG SHEET

Client Special Resource Management, Inc.
Address 917 Island
Boise, ID 83706
Contact Shelly Berry
Sampled 11/15/91 Received 11/20/91 12:11
Client Project # 12.1490.01
Client P.O. 12.1490.01
Phone # 208-345-3667
Fax Number 208-345-3725 Fax Results? Y

Project # 91-3995
Airbill # UPS
Custody Seal Intact?Cooler Y
COC Present? Y
Sample Tags Present? Y
Sample Tags Listed? Y
Sample(S) Sealed? N
Custodian/Date B. Gomez
Shipping Charges N/A

Special Instructions

Lab ID #	Client ID#	Analysis	Mtx	Btl	Loc	File #/ Date	R*
X45804A/B/C	14-215	PCE, TCE	W	40mlV	4		

*Samples to be returned
Route to: ST__ MB__ JP__ KH__ GOX OFFICE X QAX JBX SRX S/M X ET X
Checked by: _____

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

VOLATILE ORGANICS ANALYSIS DATA

Client Sample Number	: 14-215		
Lab Sample Number	: X45804	Client Project No.	: 12.1490.01
Date Sampled	: 11/15/91	Lab Project No.	: 91-3995
Date Received	: 11/20/91	Effective Dilution	: 1.00
Date Extracted/Prepared	: 11/28/91	Method	: 8260(8240)
Date Analyzed	: 11/29/91	Matrix	: WATER
Methanol Extract?	: N	Lab File No.	: >V1336
Percent Loss on Drying	: NA	Method Blank No.	: RB112891A

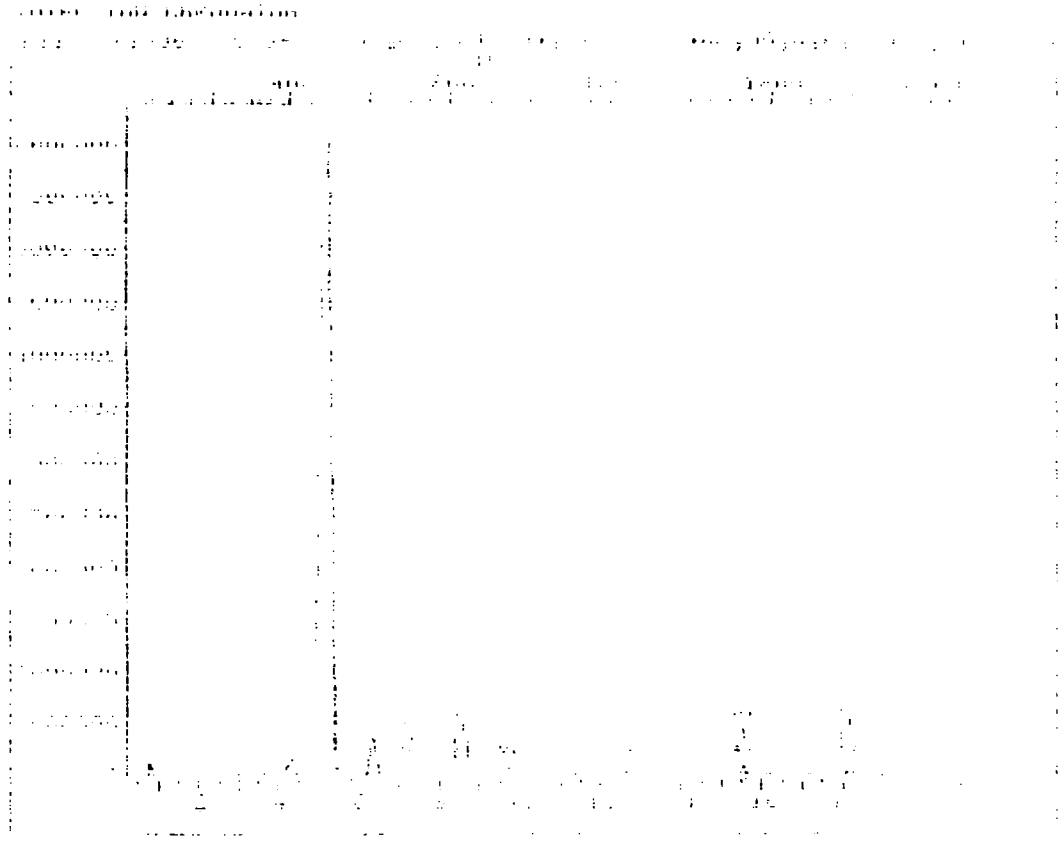
Compound Name	Cas Number	Conc. ug/L	PQL* ug/L
Trichloroethene	79-01-6	U	5
Tetrachloroethene	127-18-4	38	5

Surrogate Recoveries:		QC Limits
1,2 Dichloroethane-d4	104%	(76-114)
Toluene-d8	108%	(88-110)
Bromofluorobenzene	101%	(86-115)

Qualifiers:
U = Compound analyzed for, but not detected above reporting limits. Reporting limits are roughly the method detection limits for reagent water
J = Indicates an estimated value when the compound is detected, but is below the EPA Practical Quantitation Limit (PQL).
B = Compound found in blank and sample. Compare blank and sample data.
E = Compound is detected at a concentration outside the calibration limits.
* = Practical Quantitation Limits listed in EPA SW846, Vol. 1B, Part II, pa. 8240-4. The minimum instrument detection limits are less than the numbers shown in this column.
Unless otherwise noted all concentrations and PQL's for soils are quantitated on a dry weight basis. (NA = not applicable or not available)

Approved: _____ _____

John D Parker — Quality Assurance Officer



EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

VOLATILE ORGANICS ANALYSIS DATA
METHOD BLANK REPORT

Method Blank Number	: RB112891A	Client Project No.	: 12.1490.01
Date Extracted/Prepared	: 11/28/91	Lab Project No.	: 91-3995
Date Analyzed	: 11/28/91	Effective Dilution	: 1.00
		Method	: 8260(8240)
		Lab File No.	: >V1331

Compound Name	Cas Number	Conc. ug/L	PQL* ug/L
Trichloroethene	79-01-6	U	5
Tetrachloroethene	127-18-4	U	5

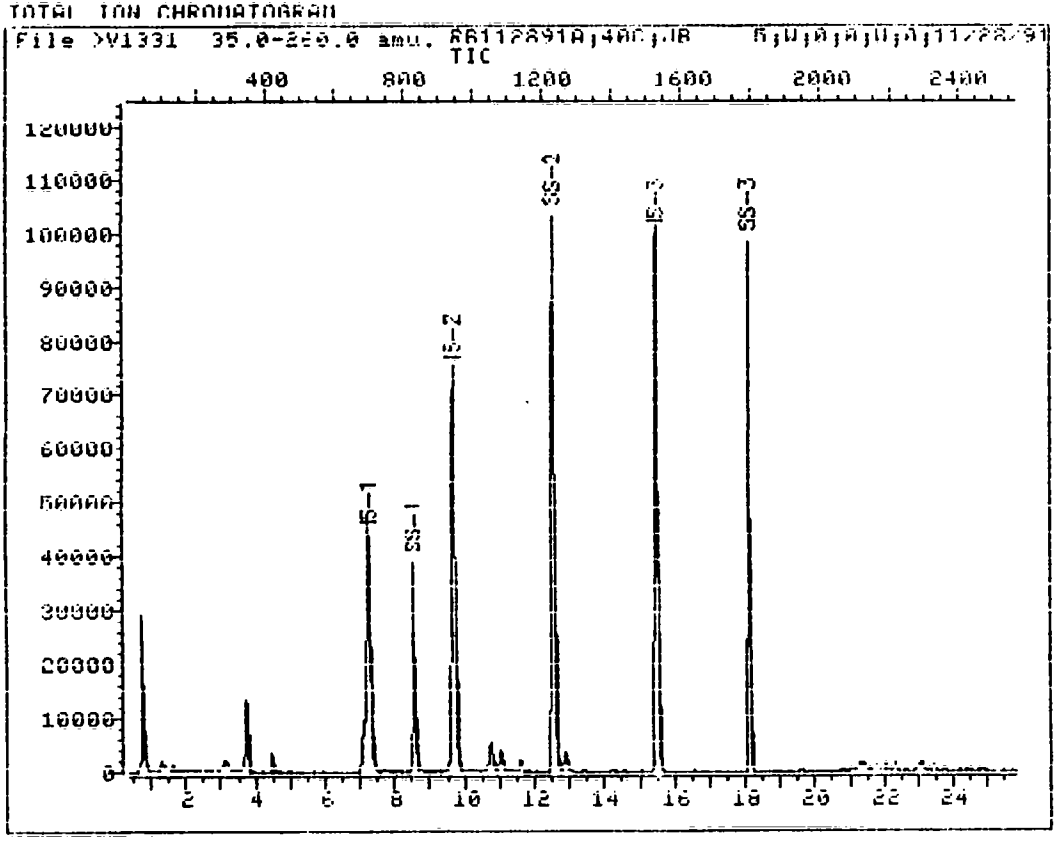
Surrogate Recoveries:		QC Limits
1,2 Dichloroethane-d4	103%	(76-114)
Toluene-d8	109%	(88-110)
Bromofluorobenzene	103%	(86-115)

Qualifiers:
U = Compound analyzed for, but not detected above reporting limits. Reporting limits are roughly the method detection limits for reagent water
J = Indicates an estimated value when the compound is detected, but is below the EPA Practical Quantitation Limit (PQL).
B = Compound found in blank and sample. Compare blank and sample data.
E = Compound is detected at a concentration outside the calibration limits.
* = Practical Quantitation Limits listed in EPA SW846, Vol. 1B, Part II, pa. 8240-4. The minimum instrument detection limits are less than the numbers shown in this column.
Unless otherwise noted all concentrations and PQL's for soils are quantitated on a dry weight basis. (NA = not applicable or not available)

Approved: _____
John D Parker

_____
Quality Assurance Officer

TOTAL ION CHROMATOGRAM



Data File: >V1331::V3
Name: RB112891A;40C;JB
Misc: 5;W;0;0;W;0;11/28/91;0

Quant Output File: ^V1331::D2
Instrument ID: VOA_1

Id File: ID_B24::WI
Title: ID FILE FOR APPENDIX NINE VOAs
Last Calibration: 911118 12:58
Last Qcal Time: <none>

Operator ID: JIM
Quant Time : 911128 23:20
Injected at: 911128 22:54

CHAIN OF CUSTODY RECORD

DATE November 15, 1991 PAGE 1 OF 1

Special Resource Management, Inc.
917 Island
Boise, ID 83706
208-345-3667 (24 Hr.)
800-654-2504 (In Idaho)

LABORATORY Evergreen Analytical
ADDRESS 4036 Youngfield Street
Wheat Ridge, Colorado 80033-3862
ATTENTION: Joel K
PROJECT NAME Westpark
JOB/P.O. NO. 12.1490.01
SAMPLE MANAGER (SIGNATURE) Shelley Berry

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	TESTING PARAMETERS: PAE	TPE	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
14-215	11/15/91	455	Rogniske	Westpark	✓	✓	3	

RELINQUISHED BY	RECEIVED BY	DATE	TOTAL NUMBER OF CONTAINERS: 3	SHIPMENT METHOD: UPS
Shelley Berry	UPS	11/15/91	REMARKS: Stored on ice	SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:
COMPANY SRM	COMPANY	TIME 1600		
RELINQUISHED BY	RECEIVED BY	DATE 11/20		
COMPANY	COMPANY	TIME 12:11		
RELINQUISHED BY	RECEIVED BY	DATE		
COMPANY	COMPANY	TIME		

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

DATA VALIDATION AND QUALITY ASSURANCE - FEBRUARY 1992

A data validation report is provided in order to evaluate the data obtained against a pre-established set of criteria to assure that the data are adequate for their intended use. The reliability of monitoring and measurement data is assessed and quality improvements efforts can be conducted accordingly. The following subsections address the data validation criteria and results for the samples collected on February 26, 1992, for the Westpark Groundwater Remediation Project. This validation encompasses results for 9 water samples, one duplicate water sample, one field equipment blank, and one travel blank. The following issues are discussed:

- Data Completeness
- Holding Time
- Surrogate Spike Recoveries
- Matrix Spike Results (batch only)
- Blank Analysis Results
- Assessment of Laboratory Precision
- Sample Detection Limits

The results of the evaluation are presented below.

· Data Completeness

Twelve samples were submitted to Analytical Laboratories of Idaho. Pumping well, monitoring well, and field quality control samples (duplicate, equipment blank, and travel blank) were analyzed for PCE and TCE. Valid data completeness was 100% for this event. This exceeds the 95% completeness requirement as set by this project. Review of laboratory data sheets and chain of custody forms indicate that all sample bottles were received in good condition.

· Holding Time

Contractual holding time between sample collection and analysis is 14 days for PCE. The holding time for all of the samples was seven days, which meets the holding time criteria.

· Surrogate Spike Results

Surrogate spike results were reviewed and evaluated. The surrogates used were fluorobenzene and 1-chloro-2-bromopropane. Surrogate spike results ranged from 81.4% to 117% for fluorobenzene, and 86.9% to 115% for 1-chloro-2-bromopropane. The percent recovery for these spikes must be within the 80%-120% control limits. All results were within this range.

- **Matrix Spike Results**

One matrix spike result for the entire batch of samples was reported by the lab. The matrix spike percent recovery fell between 91.8% and 107% percent. This is acceptable according to the Method 601-602 control limit of 80-120%.

- **Blank Analysis Results**

One equipment blank and one travel blank were used in this sampling event. The results were negative (<0.5). This indicates that no contamination of samples occurred from the sampling equipment or during transport to the laboratory.

- **Assessment of Laboratory Precision**

Duplicate samples are submitted to the laboratory to provide a measure for field procedure and laboratory analysis variability. One duplicate sample (MW-24) was submitted for monitoring well 9. The calculated relative percent difference (RPD) between the original and the duplicate was 5.7% for PCE and 5.5% for TCE. This data is very reasonable and show good laboratory precision.

- **Sample Detection Limits**

The detection limit for PCE, as set by Method 601-602, is 0.5 ug/L. This is the target limit established for and obtained by the laboratory. The Westpark groundwater is free of compounds that interfere with Method 601-602 and there is little problem maintaining a detection limit of 0.5 ug/L.

- **Conclusion**

Evaluation of the February 1992 quarterly monitoring data indicates that all data is in accordance with the requirements established for this project. None of the remaining data for this project shall be rejected. Any data that is of some question, based on the QA/QC project criteria, will be flagged and an explanation of the concern will be provided.

CHAIN OF CUSTODY RECORD

DATE February 26, 1992 PAGE 1 OF _____

Special Resource Management, Inc.
917 Island
Boise, ID 83706
208-345-3667 (24 Hr.)
800-654-2504 (In Idaho)

LABORATORY: Analytical Laboratories
ADDRESS: 1804 N. 33rd Street
Boise, Idaho 83703
ATTENTION: Dave Bennett
PROJECT NAME: Westpark
JOB/P.O. NO.: 12.1490.01
SAMPLE MANAGER (SIGNATURE): Shelley Benny

SAMPLE NO.	DATE	TIME	SAMPLER	LOCATION	TESTING PARAMETERS: PCE	TESTING PARAMETERS: TCE	NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
26-21	2/26/92	am	Benny	Well 21	✓	✓	2	3514
26-16	2/26/92	am	Benny	Well 16	✓	✓	2	515
26-18	2/26/92	am	Benny	Well 18	✓	✓	2	516
26-WP1	2/26/92	pm	Benny	Well WP1	✓	✓	2	517
26-WP2	2/26/92	pm	Benny	Well WP2	✓	✓	2	518
26-WP3	2/26/92	pm	Benny	Well WP3	✓	✓	2	519
26-WP4	2/26/92	pm	Benny	Well WP4	✓	✓	2	520
26-9	2/26/92	pm	Benny	Well 9	✓	✓	2	521
26-WP123I	2/26/92	pm	Benny	Stripper Influent	✓	✓	2	522
26-WP123E	2/26/92	pm	Benny	Stripper Effluent	✓	✓	2	523
26-EB	2/26/92	pm	Benny	Equip Blank	✓	✓	2	524
Travel blank			Bennett		✓	✓	2	525

RELINQUISHED BY	RECEIVED BY	DATE	TIME
Shelley Benny		2/27	
SRM	SRM		4:31
RELINQUISHED BY	RECEIVED BY	DATE	
	Brenda Wright	2-27	
SRM	ALI		5:00
RELINQUISHED BY	RECEIVED BY	DATE	
COMPANY	COMPANY		TIME

TOTAL NUMBER OF CONTAINERS: 24

SHIPMENT METHOD: Hand Delivered

REMARKS:
Please call SRM with results ASAP - Mark.

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:
Stored on ice

WHITE: ACCOMPANY SAMPLE YELLOW: SRM AFTER LAB SIGNS PINK: ORIGINAL SAMPLER

APPENDIX C

TABLE C-1
PCE LEVELS FROM WESTPARK AREA MONITORING WELLS
PCE levels - ppb

DATE\ID	WP1	WP2	WP3	9	11	16	18	19	20	^20R	21	EB
Oct. 89	1100	500 d800	2400	1000	15.6	183	190	1.5	9.5	-	+3.2	
April 90	379	**	1260	1090	3.6 d4.0	#176	74.9	1.1	22.5	-	44.9	<1.0
July 90	290	s320	+400 s820	763	5.9	109	145 d205	<1.0	N/S	-	30.8	<1.0
Oct. 90	660	780	1220	*850 *d980	5.1	50	170	<0.5	N/S	^50	17.2	<0.5
Feb.91	726 s428	817 s345	1110 s963	1040	2.6	13.2	81.5 d78.6	<0.5	N/S	9.9	50.7	<0.5
May 91	290	**	1090	910	4.8	39	50	<0.5	N/S	1.8	134	<0.5
Aug. 91	660	450	730	960	7.5	116	71	<0.5	N/S	0.6	48 @d34	<0.5
Nov. 91	654	620	409	714	5.6	79.2	30.2 d30.2	<0.5	N/S	1.8	39.7	<0.5
Feb. 92	340	350	520	360 d340	***	113	31.5	***	N/S	***	85	<0.5

SYMBOL DEFINITIONS ARE LOCATED ON FOLLOWING PAGE

SYMBOL DEFINITIONS FOR MONITORING WELLS PCE LEVELS TABLE

Notes:
* = QA/QC Flagged data - See Annual Data Validation Report - Held 4 days over the holding time criteria of 14 days
** = Not required in Consent Order
*** = Conditionally dropped from quarterly sampling program; will be sampled annually
# = The Apr-90 values for wells 21 and 16 were reversed from those previously reported due to an apparent field error
+ = Results are inconsistent with the trends of this well. Lab or sampling error is likely
^ = Well #20 has been decommissioned; Replacement well is #20R located approximately 30 yards north of well #20
d = Duplicate sample
s = Sampled at stripper
N/S = Not sampled
@ = Well #21 duplicate was outside the target RPD range of +/- 20%. Data not recommended for rejection

WELLPCE.WQ1

FIGURE C-1

PCE Concentrations - WP 1,2,3 (ppb)

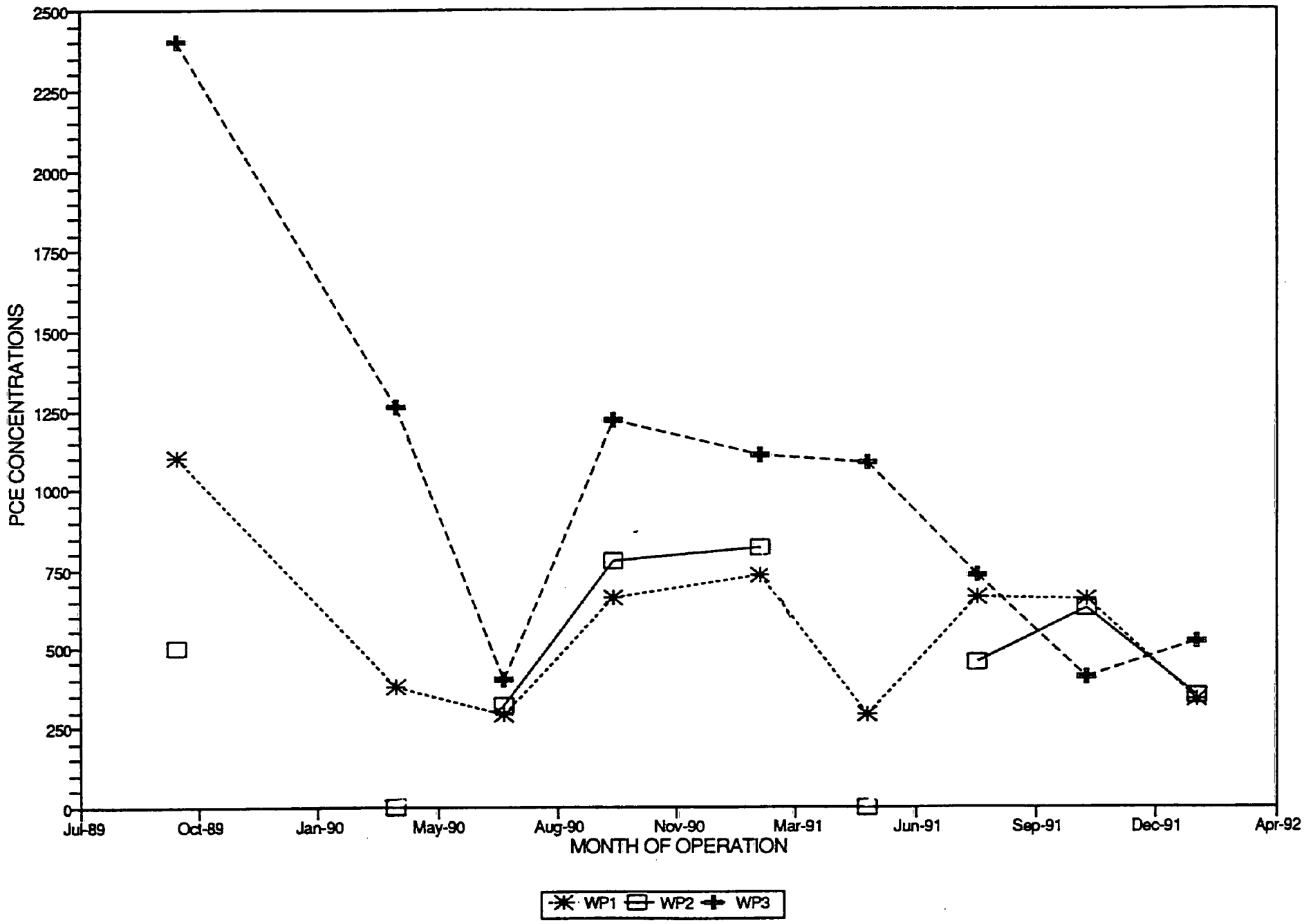


Table C-2
Groundwater Elevations
Westpark Boise Towne Plaza
Boise, Idaho

		Date:	6-Dec-90	4-Feb-91	15-May-91	7-Aug-91	10-Sep-91	14-Nov-91
Monitoring Well ID:	19	Depth to Groundwater:	10.17	10.83	9.51	7.75	7.44	11.28
Reference Elevation:	2688.42	Groundwater Elevation:	2678.25	2677.59	2678.91	2680.67	2680.98	2677.14
Monitoring Well ID:	20R	Depth to Groundwater:	10.93	11.55	10.79	9.05	NA	11.97
Reference Elevation:	2689.79	Groundwater Elevation:	2678.86	2678.24	2679.00	2680.74	NA	2677.82
Monitoring Well ID:	21	Depth to Groundwater:	NA	13.06	12.24	10.25	9.80	13.40
Reference Elevation:	2392.26	Groundwater Elevation:	NA	2379.20	2380.02	2382.01	2382.46	2378.86
Monitoring Well ID:	22	Depth to Groundwater:	NA	13.06	12.24	10.25	9.80	13.40
Reference Elevation:	2697.86	Groundwater Elevation:	NA	2684.80	2685.62	2687.61	2688.06	2684.46
Monitoring Well ID:	23	Depth to Groundwater:	NA	NA	NA	NA	NA	NA
Reference Elevation:	2701.10	Groundwater Elevation:	NA	NA	NA	NA	NA	NA
Monitoring Well ID:	DEQ-WP1	Depth to Groundwater:	NA	NA	NA	NA	11.68	14.06
Reference Elevation:	2692.27	Groundwater Elevation:	NA	NA	NA	NA	2680.59	2678.21
Monitoring Well ID:	DEQ-WP2	Depth to Groundwater:	NA	NA	NA	NA	13.21	16.66
Reference Elevation:	2699.14	Groundwater Elevation:	NA	NA	NA	NA	2685.93	2682.48
Monitoring Well ID:	DEQ-WP3	Depth to Groundwater:	NA	NA	NA	NA	14.59	16.90
Reference Elevation:	2700.82	Groundwater Elevation:	NA	NA	NA	NA	2686.23	2683.92
Monitoring Well ID:	DEQ-WP4	Depth to Groundwater:	NA	NA	NA	NA	18.29	20.21
Reference Elevation:	2704.02	Groundwater Elevation:	NA	NA	NA	NA	2685.73	2683.81
Monitoring Well ID:	MW-1	Depth to Groundwater:	NA	NA	NA	NA	NA	10.99
Reference Elevation:	2689.49	Groundwater Elevation:	NA	NA	NA	NA	NA	2678.50
Monitoring Well ID:	MW-6	Depth to Groundwater:	NA	NA	NA	NA	NA	12.74
Reference Elevation:	2690.86	Groundwater Elevation:	NA	NA	NA	NA	NA	2678.12

Table C-2
Groundwater Elevations
Westpark Boise Towne Plaza
Boise, Idaho

		Date:	6-Dec-90	4-Feb-91	15-May-91	7-Aug-91	10-Sep-91	14-Nov-91
Monitoring Well ID:	HR1	Depth to Groundwater:	13.91	14.53	13.08	11.03	10.63	12.22
Reference Elevation:	2693.02	Groundwater Elevation:	2679.11	2678.49	2679.94	2681.99	2682.39	2680.80
						**		
Monitoring Well ID:	WP1	Depth to Groundwater:	14.63	15.09	14.82	12.00	11.90	15.45
Reference Elevation:	2690.15	Groundwater Elevation:	2675.52	2675.06	2675.33	2678.15	2678.25	2674.70
					*			
Monitoring Well ID:	WP2	Depth to Groundwater:	15.55	19.29	19.25	17.72	18.30	17.52
Reference Elevation:	2689.64	Groundwater Elevation:	2674.09	2670.35	2670.39	2671.92	2671.34	2672.12
					*			
Monitoring Well ID:	WP3	Depth to Groundwater:	16.09	16.91	15.46	13.35	13.72	16.83
Reference Elevation:	2690.22	Groundwater Elevation:	2674.13	2673.31	2674.76	2676.87	2676.50	2673.39
					*	**		
Monitoring Well ID:	3	Depth to Groundwater:	12.55	13.33	12.10	9.98	9.56	13.03
Reference Elevation:	2691.80	Groundwater Elevation:	2679.25	2678.47	2679.70	2681.82	2682.24	2678.77
						**	**	
Monitoring Well ID:	9	Depth to Groundwater:	12.89	13.51	12.35	10.82	10.60	13.47
Reference Elevation:	2691.80	Groundwater Elevation:	2678.91	2678.29	2679.45	2680.98	2681.20	2678.33
					*			
Monitoring Well ID:	10	Depth to Groundwater:	11.04	11.97	10.26	8.85	8.52	13.10
Reference Elevation:	2688.40	Groundwater Elevation:	2677.36	2676.43	2678.14	2679.55	2679.88	2675.30
						**	**	
Monitoring Well ID:	11	Depth to Groundwater:	13.11	13.93	13.78	11.70	11.38	14.52
Reference Elevation:	2694.52	Groundwater Elevation:	2681.41	2680.59	2680.74	2682.82	2683.14	2680.00
Monitoring Well ID:	14	Depth to Groundwater:	NA	13.31	NA	10.98	NA	13.58
Reference Elevation:	2691.44	Groundwater Elevation:	NA	2678.13	NA	2680.46	NA	2677.86
Monitoring Well ID:	16	Depth to Groundwater:	12.98	13.69	12.89	10.98	10.43	14.14
Reference Elevation:	2691.58	Groundwater Elevation:	2678.60	2677.89	2678.69	2680.60	2681.15	2677.44
Monitoring Well ID:	18	Depth to Groundwater:	13.73	14.48	14.00	12.14	11.60	15.47
Reference Elevation:	2694.99	Groundwater Elevation:	2681.26	2680.51	2680.99	2682.85	2683.39	2679.52
								***

Table C-2
Groundwater Elevations
Westpark Boise Towne Plaza
Boise, Idaho

		Date:	6-Dec-90	4-Feb-91	15-May-91	7-Aug-91	10-Sep-91	14-Nov-91
Monitoring Well ID:	MW-7	Depth to Groundwater:	NA	NA	NA	NA	NA	11.00
Reference Elevation:	2688.88	Groundwater Elevation:	NA	NA	NA	NA	NA	2677.88
Monitoring Well ID:	MW-8	Depth to Groundwater:	NA	NA	NA	NA	NA	12.19
Reference Elevation:	2690.21	Groundwater Elevation:	NA	NA	NA	NA	NA	2678.02
Monitoring Well ID:	MW-9	Depth to Groundwater:	NA	NA	NA	NA	NA	12.80
Reference Elevation:	2690.64	Groundwater Elevation:	NA	NA	NA	NA	NA	2677.84
Monitoring Well ID:	MW-10	Depth to Groundwater:	NA	NA	NA	NA	NA	NA
Reference Elevation:	2688.63	Groundwater Elevation:	NA	NA	NA	NA	NA	NA
Monitoring Well ID:	MW-11	Depth to Groundwater:	NA	NA	NA	NA	NA	11.54
Reference Elevation:	2689.91	Groundwater Elevation:	NA	NA	NA	NA	NA	2678.37

Table C-2
Groundwater Elevations
Westpark Boise Towne Plaza
Boise, Idaho

		Date:	22-Jan-92	26-Feb-92
Monitoring Well ID:	HR1	Depth to Groundwater:	NA	16.04
Reference Elevation:	2693.24	Groundwater Elevation:	NA	2677.20
Monitoring Well ID:	WP1	Depth to Groundwater:	17.42	18.62
Reference Elevation:	2690.15	Groundwater Elevation:	2672.73	2671.53
Monitoring Well ID:	WP2	Depth to Groundwater:	22.55	20.30
Reference Elevation:	2690.16	Groundwater Elevation:	2667.61	2669.86
Monitoring Well ID:	WP3	Depth to Groundwater:	18.40	18.98
Reference Elevation:	2690.71	Groundwater Elevation:	2672.31	2671.73
Monitoring Well ID:	3	Depth to Groundwater:	NA	14.80
Reference Elevation:	2692.10	Groundwater Elevation:	NA	2677.30
Monitoring Well ID:	9	Depth to Groundwater:	14.39	17.74
Reference Elevation:	2691.19	Groundwater Elevation:	2676.80	2673.45
Monitoring Well ID:	10	Depth to Groundwater:	NA	14.58
Reference Elevation:	2688.88	Groundwater Elevation:	NA	2674.30
Monitoring Well ID:	11	Depth to Groundwater:	15.07	16.35
Reference Elevation:	2695.22	Groundwater Elevation:	2680.15	2678.87
			****	
Monitoring Well ID:	14	Depth to Groundwater:	14.25	14.62
Reference Elevation:	2692.00	Groundwater Elevation:	2677.75	2677.38
			****	
Monitoring Well ID:	16	Depth to Groundwater:	NA	15.14
Reference Elevation:	2692.79	Groundwater Elevation:	NA	2677.65
Monitoring Well ID:	18	Depth to Groundwater:	15.57	17.18
Reference Elevation:	2694.60	Groundwater Elevation:	2679.03	2677.42
			****	

Table C-2
Groundwater Elevations
Westpark Boise Towne Plaza
Boise, Idaho

			Date:	22-Jan-92	26-Feb-92
Monitoring Well ID:	19	Depth to Groundwater:		11.78	12.88
Reference Elevation:	2688.73	Groundwater Elevation:		2676.95	2675.85
Monitoring Well ID:	20R	Depth to Groundwater:		NA	13.42
Reference Elevation:	2690.32	Groundwater Elevation:		NA	2676.90
Monitoring Well ID:	21	Depth to Groundwater:		NA	14.50
Reference Elevation:	2692.16	Groundwater Elevation:		NA	2677.66
Monitoring Well ID:	22	Depth to Groundwater:		13.40	13.40
Reference Elevation:	2697.86	Groundwater Elevation:		2684.46	2684.46
Monitoring Well ID:	23	Depth to Groundwater:		19.33	19.83
Reference Elevation:	2701.10	Groundwater Elevation:		2681.77	2681.27
				**	
Monitoring Well ID:	DEQ-WP1	Depth to Groundwater:		NA	15.88
Reference Elevation:	2697.27	Groundwater Elevation:		NA	2681.39
Monitoring Well ID:	DEQ-WP2	Depth to Groundwater:		NA	NA
Reference Elevation:	2699.14	Groundwater Elevation:		NA	NA
Monitoring Well ID:	DEQ-WP3	Depth to Groundwater:		NA	NA
Reference Elevation:	2700.82	Groundwater Elevation:		NA	NA
Monitoring Well ID:	DEQ-WP4	Depth to Groundwater:		21.36	NA
Reference Elevation:	2704.02	Groundwater Elevation:		2682.66	NA
Monitoring Well ID:	MW-1	Depth to Groundwater:		NA	NA
Reference Elevation:	2689.49	Groundwater Elevation:		NA	NA
Monitoring Well ID:	MW-6	Depth to Groundwater:		NA	NA
Reference Elevation:	2690.86	Groundwater Elevation:		NA	NA

Table C-2
Groundwater Elevations
Westpark Boise Towne Plaza
Boise, Idaho

		Date:	22-Jan-92	26-Feb-92
Monitoring Well ID:	MW-7	Depth to Groundwater:	NA	12.80
Reference Elevation:	2688.88	Groundwater Elevation:	NA	2676.08
Monitoring Well ID:	MW-8	Depth to Groundwater:	NA	NA
Reference Elevation:	2690.21	Groundwater Elevation:	NA	NA
Monitoring Well ID:	MW-9	Depth to Groundwater:	NA	NA
Reference Elevation:	2690.64	Groundwater Elevation:	NA	NA
Monitoring Well ID:	MW-10	Depth to Groundwater:	NA	12.04
Reference Elevation:	2688.63	Groundwater Elevation:	NA	2676.59
Monitoring Well ID:	MW-11	Depth to Groundwater:	NA	NA
Reference Elevation:	2689.91	Groundwater Elevation:	NA	NA

Table C-2
Groundwater Elevations
Westpark Boise Towne Plaza
Boise, Idaho

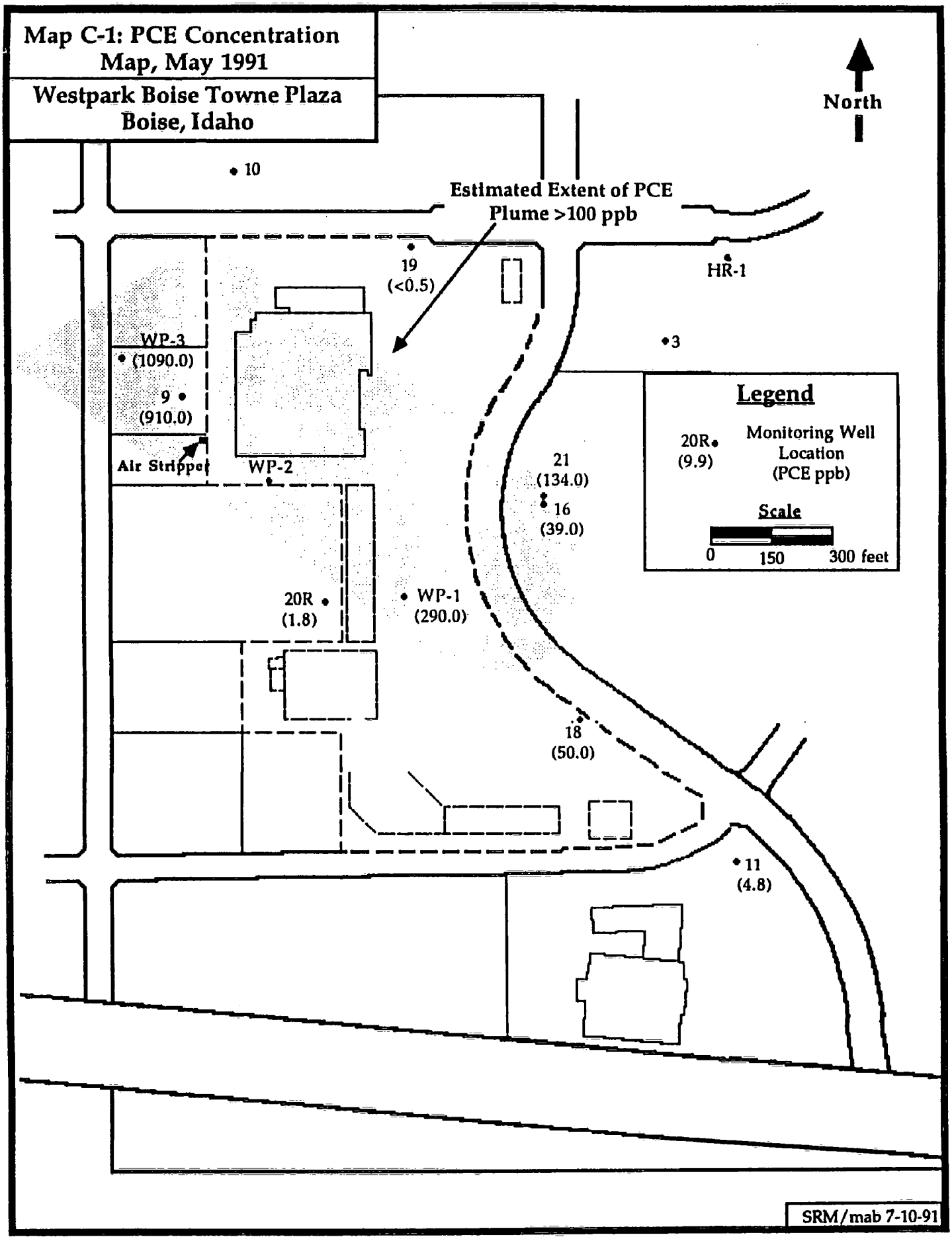
Notes: Reference point elevations re-surveyed 22-Jan-92

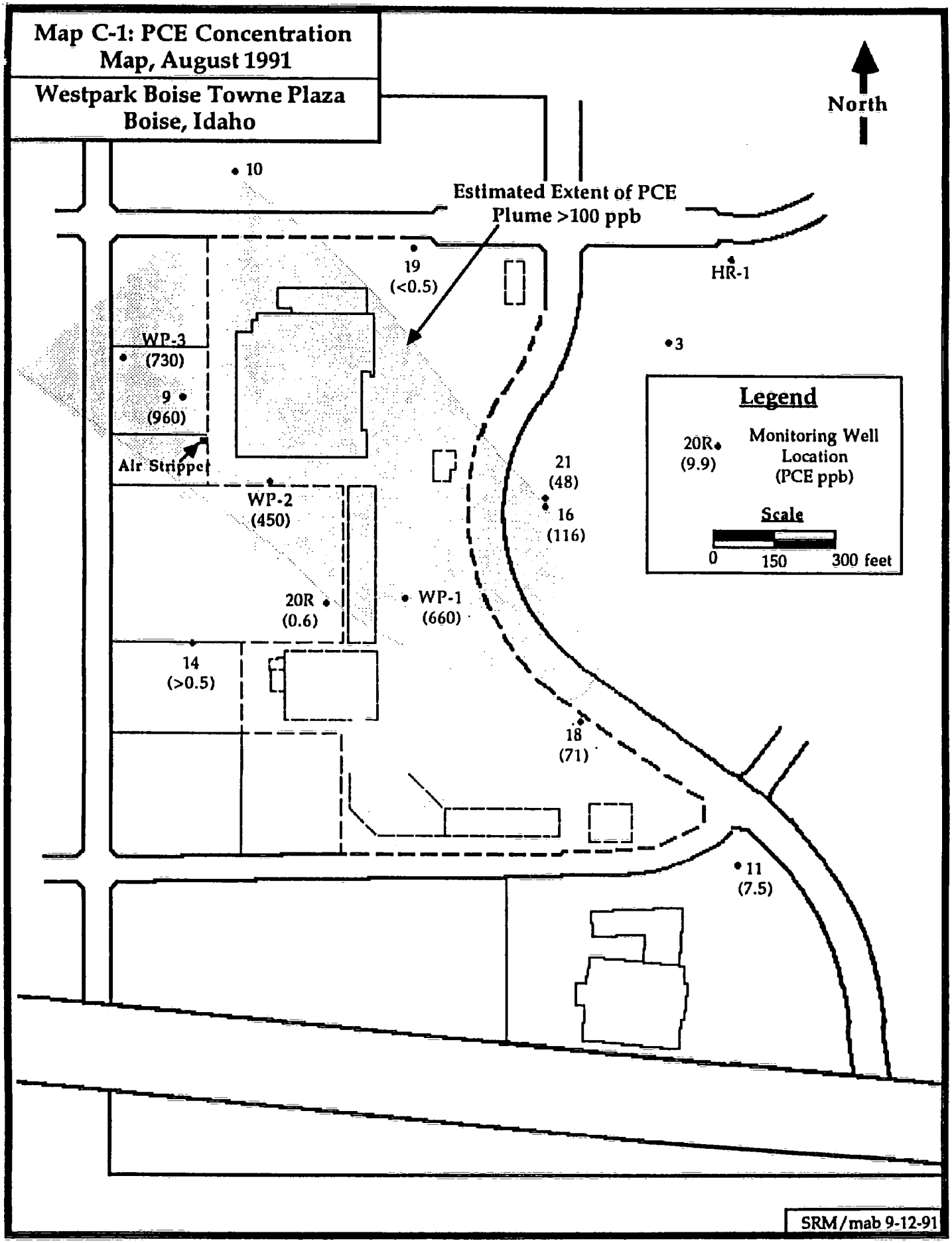
* Measured on 16-May-91

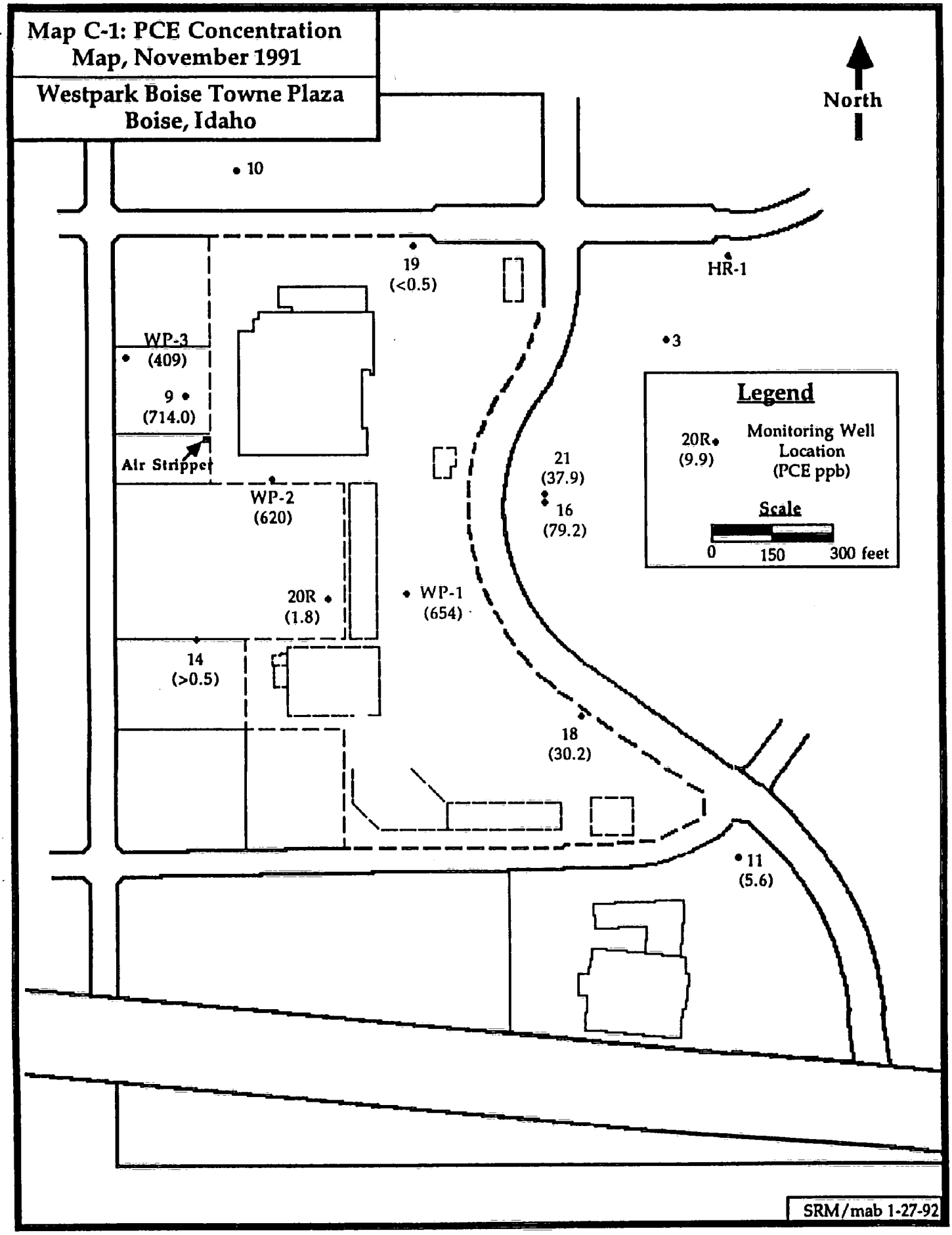
** Measured on 8-Aug-91

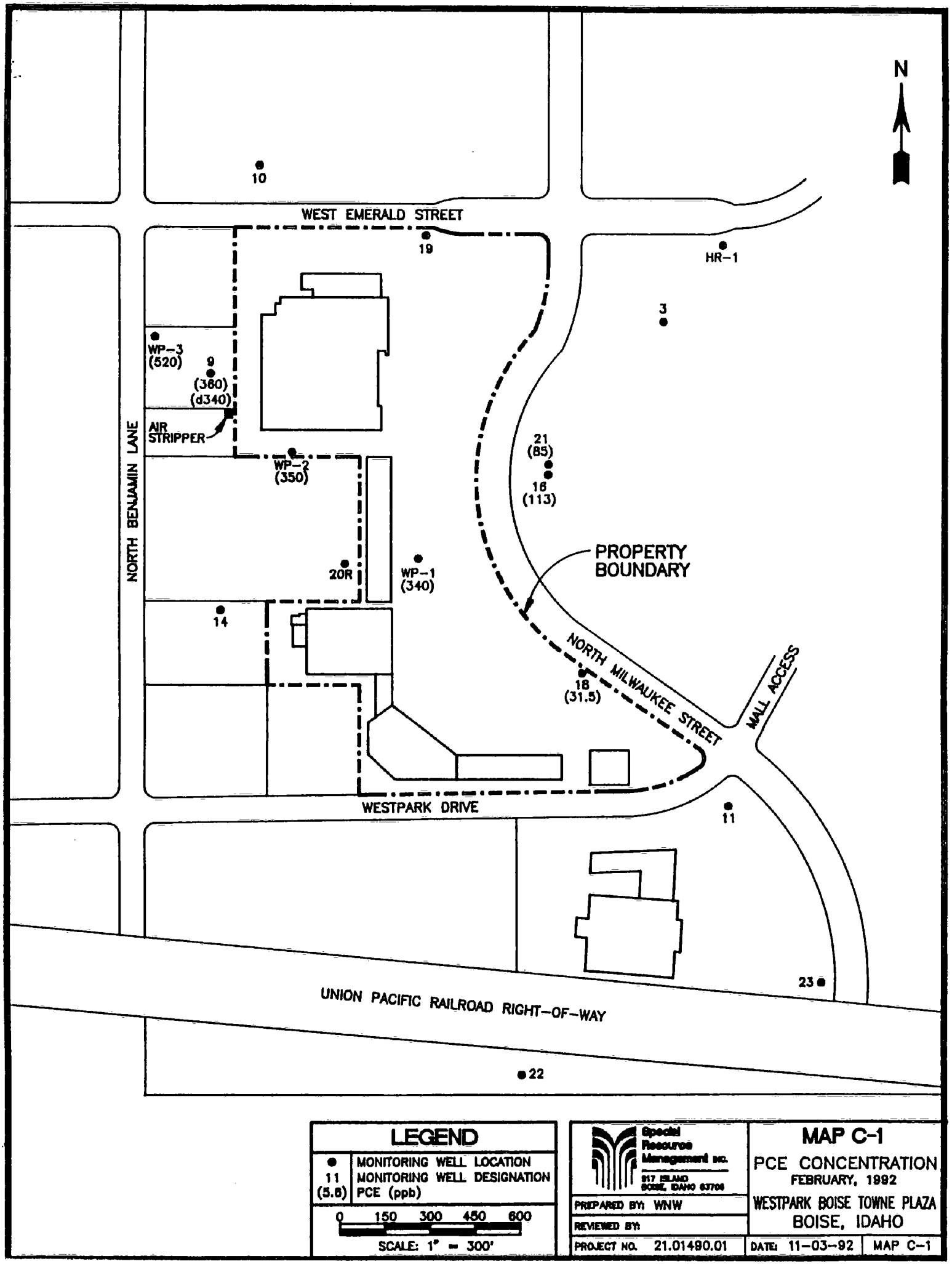
*** Measured on 15-Nov-91

**** Measured on 23-Jan-92


Map C-1: PCE Concentration Map, May 1991
Westpark Boise Towne Plaza
Boise, Idaho
North
10
Estimated Extent of PCE Plume >100 ppb
19 (<0.5)
HR-1
3
WP-3 (1090.0)
9 (910.0)
Air Stripper
WP-2
21 (134.0)
16 (39.0)
20R (1.8)
WP-1 (290.0)
18 (50.0)
11 (4.8)
Legend
20R (9.9)
Monitoring Well Location (PCE ppb)
Scale
0 150 300 feet
SRM/mab 7-10-91


Map C-1: PCE Concentration Map, August 1991
Westpark Boise Towne Plaza
Boise, Idaho
North
10
Estimated Extent of PCE Plume >100 ppb
19 (<0.5)
HR-1
WP-3 (730)
3
9 (960)
Air Stripper
21 (48)
16 (116)
WP-2 (450)
20R (0.6)
WP-1 (660)
14 (>0.5)
18 (71)
11 (7.5)
Legend
20R (9.9)
Monitoring Well Location (PCE ppb)
Scale
0
150
300 feet
SRM/mab 9-12-91


Map C-1: PCE Concentration Map, November 1991
Westpark Boise Towne Plaza
Boise, Idaho
North
10
19
(<0.5)
HR-1
3
WP-3
(409)
9
(714.0)
Air Stripper
WP-2
(620)
21
(37.9)
16
(79.2)
20R
(1.8)
WP-1
(654)
14
(>0.5)
18
(30.2)
11
(5.6)
Legend
20R
(9.9)
Monitoring Well Location
(PCE ppb)
Scale
0
150
300 feet
SRM/mab 1-27-92



LEGEND

●	MONITORING WELL LOCATION
11	MONITORING WELL DESIGNATION
(5.6)	PCE (ppb)

0 150 300 450 600

SCALE: 1" = 300'

Special Resource Management INC.
917 ISLAND
BOISE, IDAHO 83706

PREPARED BY: WNW

REVIEWED BY:

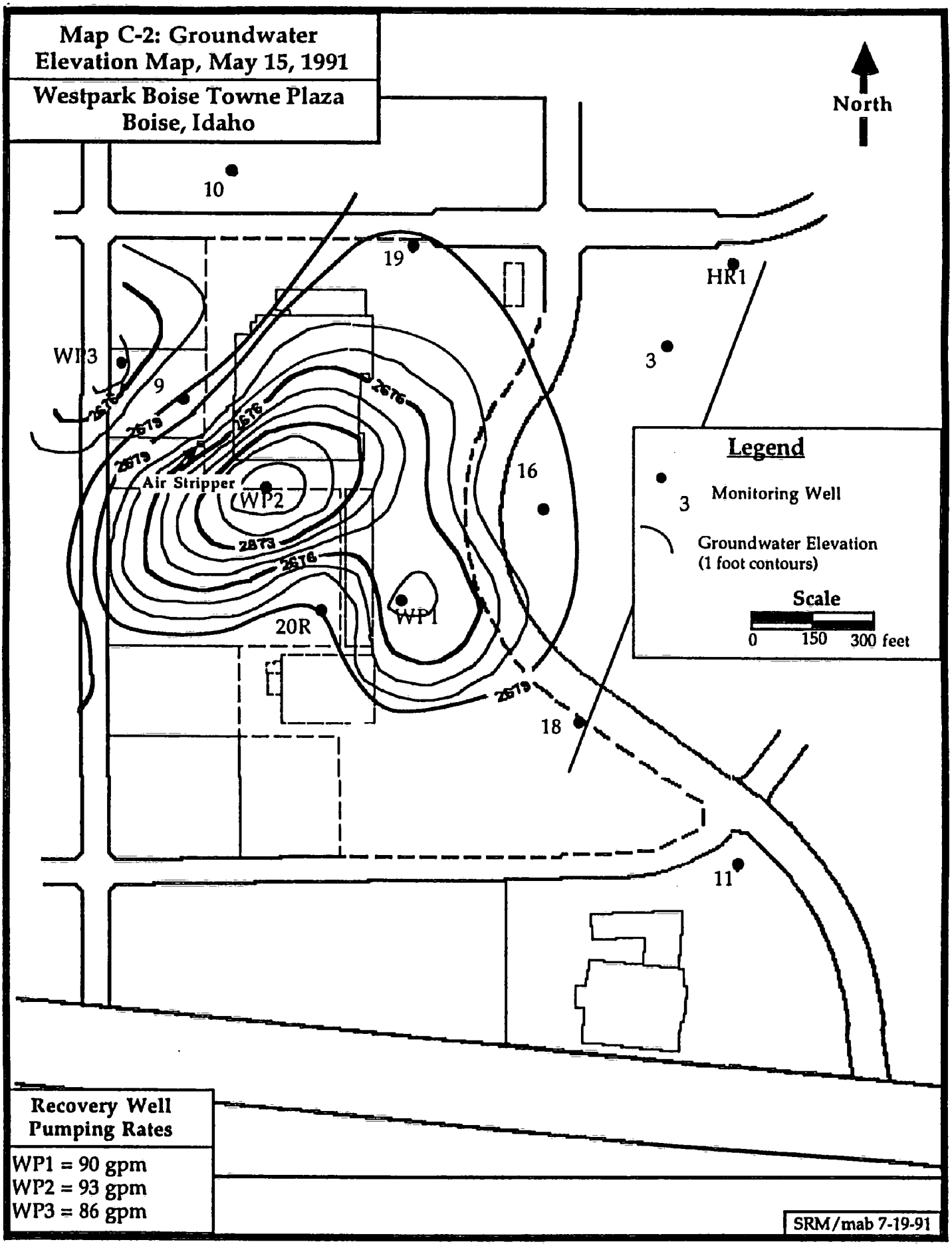
PROJECT NO. 21.01490.01

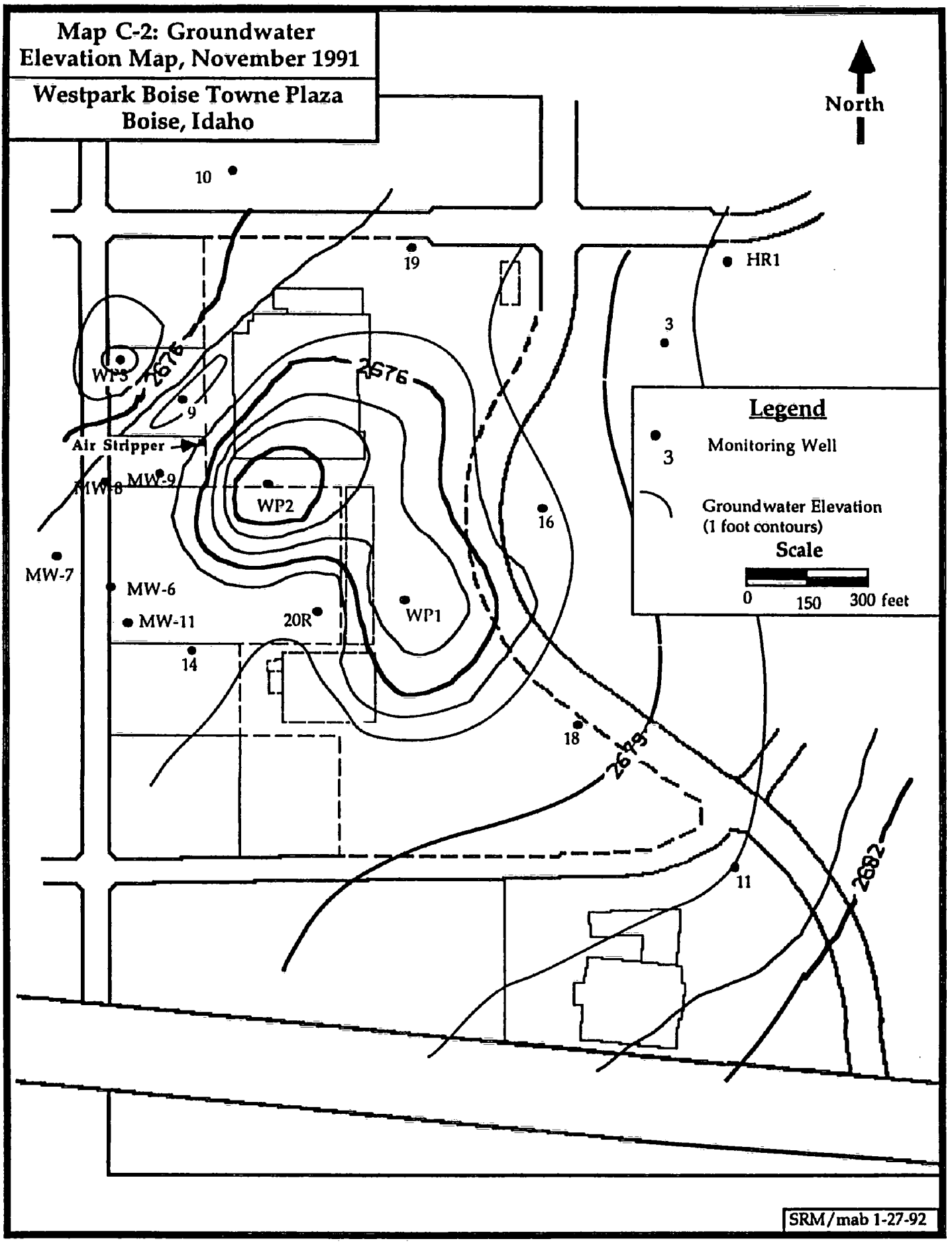
MAP C-1

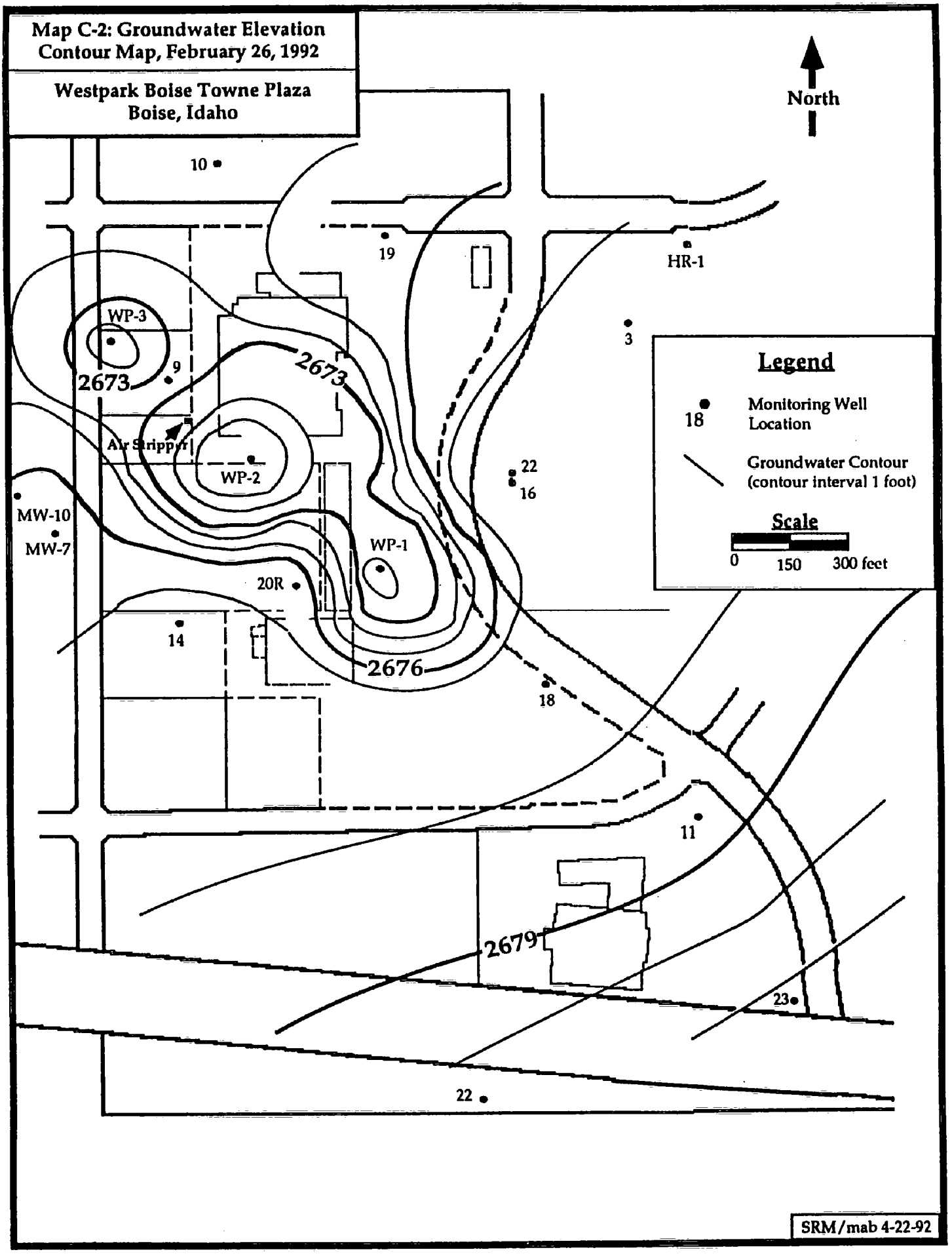
PCE CONCENTRATION
FEBRUARY, 1992

WESTPARK BOISE TOWNE PLAZA
BOISE, IDAHO

DATE: 11-03-92 | MAP C-1


Map C-2: Groundwater Elevation Map, May 15, 1991
Westpark Boise Towne Plaza
Boise, Idaho
North
10
19
HR1
WP3
9
3
2676
2673
2676
2673
2676
Air Stripper
WP2
16
2673
2676
20R
WP1
2673
18
11
Legend
3
Monitoring Well
Groundwater Elevation
(1 foot contours)
Scale
0
150
300 feet
Recovery Well
Pumping Rates
WP1 = 90 gpm
WP2 = 93 gpm
WP3 = 86 gpm
SRM/mab 7-19-91


Map C-2: Groundwater Elevation Map, November 1991
Westpark Boise Towne Plaza
Boise, Idaho
North
10
19
HR1
3
WP3
2676
2676
9
Air Stripper
MW-8
MW-9
WP2
16
MW-7
MW-6
MW-11
20R
WP1
14
18
2673
11
2682
Legend
3
Monitoring Well
Groundwater Elevation
(1 foot contours)
Scale
0
150
300 feet
SRM/mab 1-27-92


Map C-2: Groundwater Elevation Contour Map, February 26, 1992
Westpark Boise Towne Plaza
Boise, Idaho
North
10
19
HR-1
3
WP-3
9
2673
2673
Air Stripper
WP-2
22
16
MW-10
MW-7
WP-1
20R
14
2676
18
11
2679
23
22
Legend
18
Monitoring Well Location
Groundwater Contour (contour interval 1 foot)
Scale
0
150
300 feet
SRM/mab 4-22-92

APPENDIX D

TABLE D-1
WELL WP1 - FLOW RATES AND PCE LEVELS
(Sample Events Only)

DATE	DAY OF OPERATION	FLOW RATE gpm	PCE ppb	PCE ppm	PCE pph
*WP1 not running. Samples taken from the well and not the stripper influent site - PCE pph can not be determined.					
03/15/90	4	69	800	0.800	0.0272
03/16/90	5	68	920	0.920	0.0309
03/17/90	6	68	980	0.980	0.0329
03/23/90	12	60	585	0.585	0.0173
03/30/90	19	58	876	0.876	0.0251
04/06/90	26	60	285	0.285	0.0084
04/13/90	33	62	212	0.212	0.0065
04/20/90	40	90	239	0.239	0.0106
04/25/90	45	81	300	0.300	0.0120
04/27/90	47	80	408	0.408	0.0161
07/20/90	131	0	290	0.290	*
10/24/90	227	0	660	0.660	*
02/06/91	333	81	726	0.726	0.0290
05/16/91	431	90	290	0.290	0.0129
08/07/91	514	89	660	0.660	0.0290
11/14/92	613	93	654	0.654	0.0300
02/26/92	717	98	340	0.340	0.0164

TABLE D-2
WELL WP2 - FLOW RATES AND PCE LEVELS
(Sample Events Only)

DATE	DAY OF OPERATION	FLOW RATE gpm	PCE ppb	PCE ppm	PCE pph
*WP2 Flow rate not taken - PCE pph cannot be determined.					
**Not Required in Consent Order					
03/13/90	2	103	850	0.8500	0.0432
03/14/90	3	101	1080	1.0800	0.0538
03/15/90	4	103	1000	1.0000	0.0508
03/16/90	5	101	924	0.9240	0.0460
03/17/90	6	102	890	0.8900	0.0448
03/23/90	12	100	803	0.8030	0.0396
03/30/90	19	100	602	0.6020	0.0297
04/06/90	26	97	146	0.1460	0.0070
04/13/90	33	95	44	0.0440	0.0021
04/20/90	40	106	185	0.1850	0.0097
04/25/90	45	100	240	0.2400	0.0118
04/27/90	47	100	346	0.3460	0.0171
06/22/90	103	130	330	0.3300	0.0212
07/20/90	131	132	320	0.3200	0.0208
10/18/90	221	0	780	0.7800	*
02/06/91	333	111	817	0.8170	0.0447
05/16/91	431	93	**	0.0000	0.0000
08/07/91	514	96	450	0.4500	0.0213
11/14/91	613	89	620	0.6200	0.0272
02/26/92	717	56	350	0.3500	0.0097

TABLE D-3
WELL WP3 - FLOW RATES AND PCE LEVELS
(Sample Events Only)

DATE	DAY OF OPERATION	FLOW RATE gpm	PCE ppb	PCE ppm	PCE pph
*WP3 Flow rate not taken - PCE pph cannot be determined.					
03/14/90	3	63	1700	1.7000	0.0528
04/25/90	45	52	1040	1.0400	0.0267
04/27/90	47	51	1210	1.2100	0.0304
05/03/90	53	0	1050	1.0500	*
07/20/90	131	32	820	0.8200	0.0129
10/18/90	221	0	1220	1.2200	*
02/06/90	333	78	1111	1.1110	0.0428
05/16/91	431	86	1090	1.0900	0.0463
08/07/91	514	80	730	0.7300	0.0288
11/14/91	613	78	409	0.4090	0.0157
02/26/92	717	91	520	0.5200	0.0233

TABLE D-4
WELLS WP1,2,3 - INLUENT
FLOW RATES AND PCE LEVELS
(Quarterly Sample Events Only)

DATE	DAY OF OPERATION	FLOW RATE gpm	PCE ppb	PCE ppm	PCE pph
*All flow rates from this date on have been adjusted according to the effluent meter. This gauge provides a more accurate flow rate.					
04/13/90	33	157	308	0.3080	0.0239
07/20/90	131	164	590	0.5900	0.0477
10/24/90	227	0	-	-	-
*02/06/91	*332	*270	*765	*0.7650	*0.1019
05/16/91	431	269	430	0.4300	0.0571
08/07/91	514	265	640	0.6400	0.0837
11/14/91	613	260	474	0.4740	0.0608
02/26/92	717	245	410	0.4100	0.0496

TABLE D-5
WELLS WP1,2,3 - EFFLUENT
FLOW RATES AND PCE LEVELS
(Quarterly Sample Events Only)

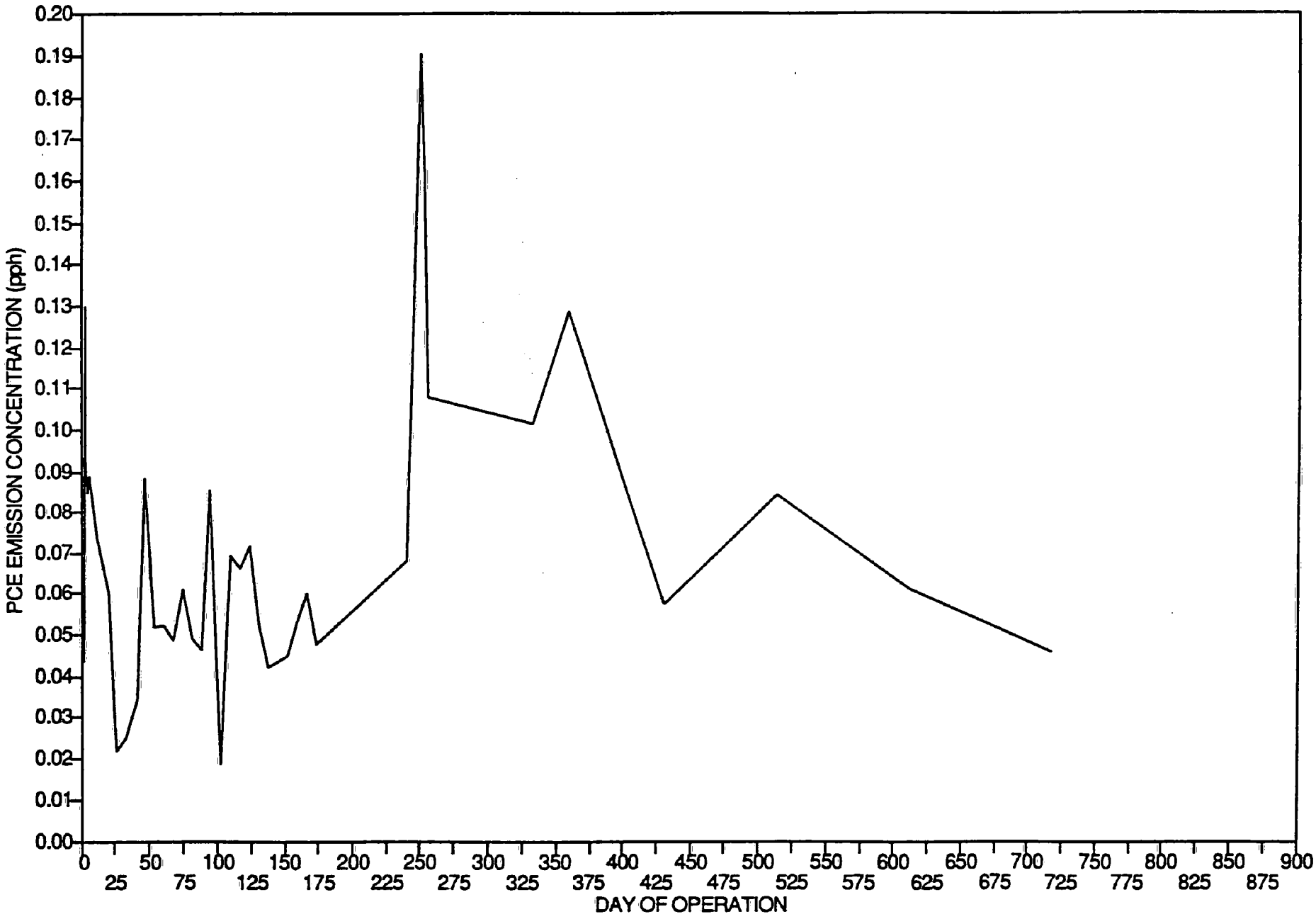
DATE	DAY OF OPERATION	FLOW RATE gpm	PCE ppb	PCE ppm	PCE pph
*All flow rates from this date on have been adjusted according to the effluent meter. This gauge provides a more accurate flow rate.					
^Attempts to phase in WP3.					
04/13/90	33	168	7.2	0.0072	0.0006
07/20/90	131	180	^8.2	0.0082	0.0007
10/24/90	227	133	3.6	0.0036	0.0002
*02/06/91	*332	*270	*14.8	*0.0148	*0.0020
03/05/91	359	266	4.3	0.0043	0.0006
05/16/91	431	268	3.4	0.0034	0.0004
08/07/91	514	265	4.7	0.0047	0.0006
11/14/91	613	260	3.3	0.0033	0.0004
02/26/92	717	245	2.5	0.0025	0.0003

APPENDIX E

TABLE E-1
PCE AIR EMISSIONS (PPM AND PPH)

DATE	DAY OF OPERATION	FLOW RATE EFFLUENT gpm	PCE INFLUENT ppm	PCE EFFLUENT ppm	EMISSION SOURCE STRENGTH g/sec	PCE EMISSION ppm	PCE EMISSIONS pph
# March 1991 re-sample result - The influent value is an average of PCE concentration for the Fourth Quarter.							
02/06/91	332	270	0.7650	0.0148	0.0128	0.4896	0.1014
#03/05/91	359	266	0.9700	0.0043	0.0162	0.6209	0.1285
05/15/91	431	269	0.4300	0.0034	0.0072	0.2774	0.0574
08/07/91	514	265	0.6400	0.0047	0.0106	0.4069	0.0842
11/14/91	613	260	0.4740	0.0033	0.0077	0.2958	0.0612
02/26/92	717	225	0.4100	0.0027	0.0058	0.2215	0.0459

FIGURE E-1
PCE AIR EMISSIONS



APPENDIX F

TABLE F-1
WEEKLY WELL FLOW RATES - WP1, WP2, WP3, AND COMBINED INFLUENT/EFFLUENT (GPM)

DATE	WEEK OF OPERATION	WP1	WP2	WP3	COMBINED INF/EFF
01/07/91	44	0	0	0	0
01/14/91	45	0	0	0	0
01/21/91	46	81	115	79	275
01/29/91	47	78	116	76	270
02/07/91	48	81	111	78	270
02/15/91	49	0	110	94	204
02/22/91	50	75	118	75	268
03/07/91	52	85	97	85	267
03/15/91	53	88	96	82	266
03/21/91	54	90	96	84	270
03/28/91	55	92	96	82	270
04/05/91	56	89	96	85	270
04/11/91	57	90	97	88	275
04/18/91	58	88	94	85	267
04/25/91	59	91	94	87	272
05/02/91	60	93	94	86	273
05/09/91	61	88	95	87	270
05/15/91	62	90	93	86	269
05/21/91	63	92	95	87	274
05/30/91	64	91	94	85	270
06/07/91	65	0	0	0	0
06/12/91	66	88	99	83	270
06/19/91	67	90	98	80	268
06/26/91	68	89	97	82	268
07/11/91	70	88	99	83	270
07/18/91	71	88	96	82	266
07/26/91	72	90	95	80	265
07/31/91	73	0	0	0	0
08/07/91	74	89	96	80	265
08/16/91	75	91	94	80	265
08/21/91	76	92	97	81	270
08/29/91	77	86	96	83	265
09/06/91	78	90	95	80	265
09/13/91	79	89	94	82	265
09/17/91	80	91	96	83	270

TABLE F-1 (continued)
WEEKLY WELL FLOW RATES - WP1, WP2, WP3, AND COMBINED INFLUENT/EFFLUENT (GPM)

DATE	WEEK OF OPERATION	WP1	WP2	WP3	COMBINED INF/EFF
09/26/91	81	92	96	77	265
10/05/91	82	88	92	80	260
10/10/91	83	91	91	78	260
10/18/91	84	95	95	80	270
10/25/91	85	92	93	80	265
10/31/91	86	89	91	80	260
11/07/91	87	88	90	82	260
11/14/91	88	93	89	78	260
11/22/91	89	93	90	82	265
11/26/91	90	0	0	0	0
12/04/91	91	94	95	81	270
12/19/91	93	91	81	73	245
12/30/91	95	100	58	92	250
01/09/92	96	100	55	95	250
01/17/92	97	100	58	92	250
01/24/92	98	98	60	92	250
01/29/92	99	99	59	97	255
02/05/92	100	102	56	97	255
02/14/92	101	102	56	97	255
02/26/92	103	98	56	91	245

TABLE F-2
QUARTERLY RESULTS FOR WELLS WP1, WP2, WP3, INFLUENT, AND EFFLUENT
PCE & TCE Concentrations- ppb

		STRIPPER INFLUENT												STRIPPER EFFLUENT		
		WP1			WP2			WP3			Combined					
DATE	ADJUST	gpm	PCE	TCE	gpm	PCE	TCE	gpm	PCE	TCE	gpm	PCE	TCE	gpm	PCE	TCE
04/13/90	No	62	212	-	95	44	-	0	-	-	157	308	-	168	7.2	<1.0
07/20/90	No	0	-	-	132	320	-	*32	*820	-	164	*590	-	180	*8.2	-
10/18/90	No	0	-	-	133	490	-	0	1290	-	133	-	-	-	-	-
10/24/90	Yes	0	660	-	0	-	-	0	-	-	133	-	-	109	3.6	-
#2/06/91	Yes	81	428	1.6	111	345	1.4	78	963	4.2	270	765	3.2	270	14.8	<0.5
03/05/91	Yes	85	-	-	96	-	-	85	-	-	266	-	-	266	4.3	-
05/16/91	No	90	290	1.9	93	-	-	86	1090	6.4	269	430	2.5	269	3.4	-
08/08/91	No	89	660	3.2	96	450	3	80	730	1.1	265	640	3.3	265	4.7	<0.5
11/14/91	Yes	93	654	4.1	89	620	5.1	78	409	2.9	260	474	2.6	260	3.3	<0.5
02/26/92	No	90	340	1.6	52	350	2.2	83	520	3.8	225	410	2.7	225	2.5	<0.5

* = Attempts to phase in well WP3
- = Not collected or not analyzed
= All flow rates from this date on have been adjusted according to the effluent meter.

DW/123IEQT.WQ1